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# MS-7811

ATX

Ver:12

## Intel -SharkBay plamform (Z87-XPOWER)

### CPU:

Haswell LGA1150

CPU POWLSTAGE\*32 Phase

### System Chipset:

Lynx Point Z87

### Onboard Chip:

HD Audio Codec:ALC1150

LAN-QUALCOMM E2205-B

SIO:NCT6779D

Flash ROM: SPI 64 MB X2

CLK GEN: IDT4105

CLK BUF: IDT1216+IDT0841

WiFi / BT: Rear IO Pinheader

USB Hotkey: Fintek F75501

USB Charge: SLG55583A

### PWM:

VCORE: VRD12.5 -IR3563 - 32Phase

DDR : IR3570 - 3Phase

PCH(1.05V) -IR3570- 1Phase

PLX(0.9V) -uP1504T - 1Phase

### Other:

SATA3.0 x4(PCH)

SATA3.0 x6 (ASM1061 SATA 6G)

REAR ASM1074 x2 ( USB3.0 x 8 )

FRONT ASM1464 \*4 ( USB3.0 \*4)

REAR USB HOTKEY \*2

### Main Memory:

DDRIII (800/1066/1333/1666MHz) \* 4 (Dual Channel)

### ACPI:

UPI-uP7501+uP1714

### Expansion Slots:

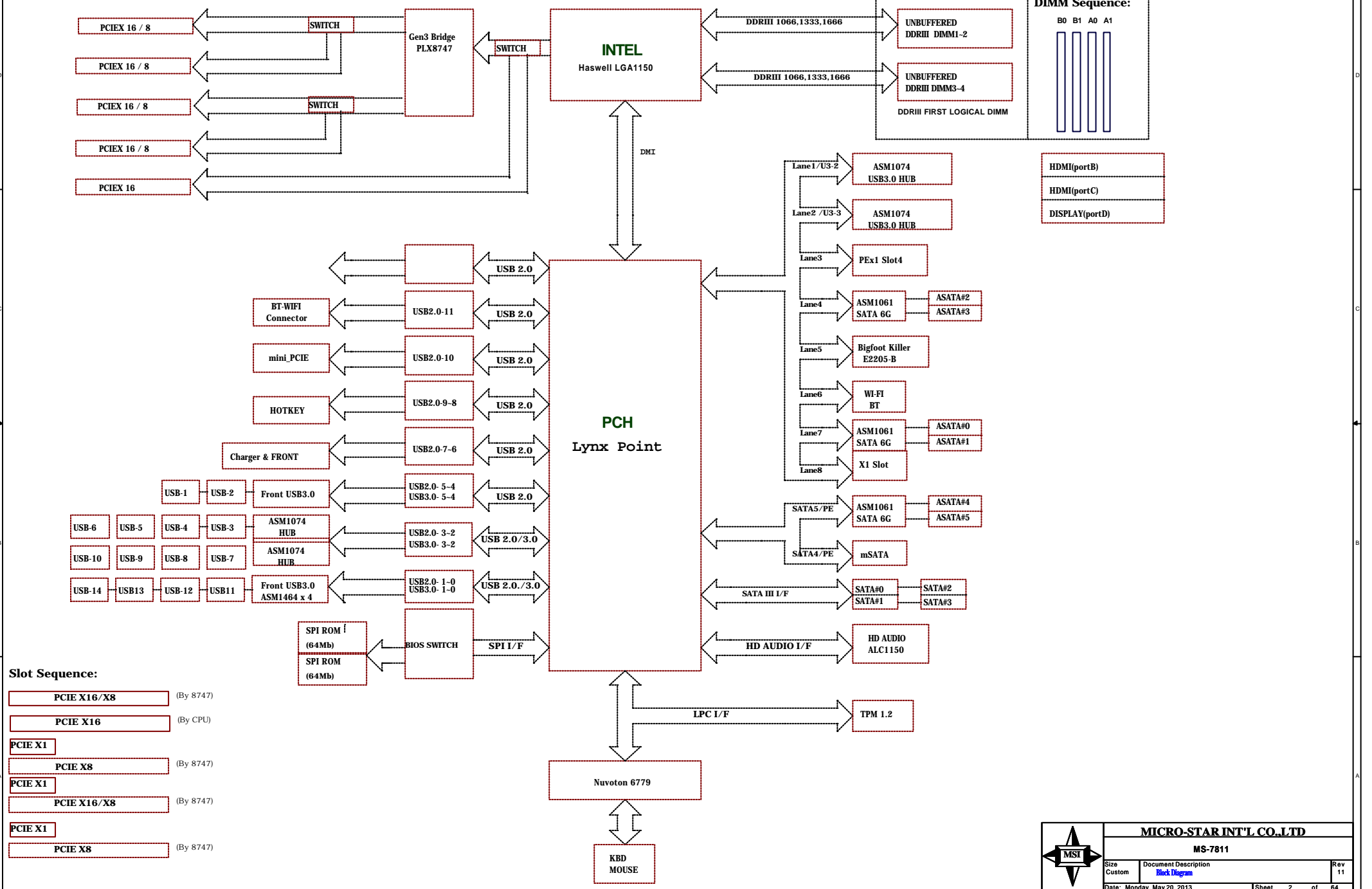
PCI Express (X16) Slot \* 5

PCI Express (X1 ) Slot \* 2

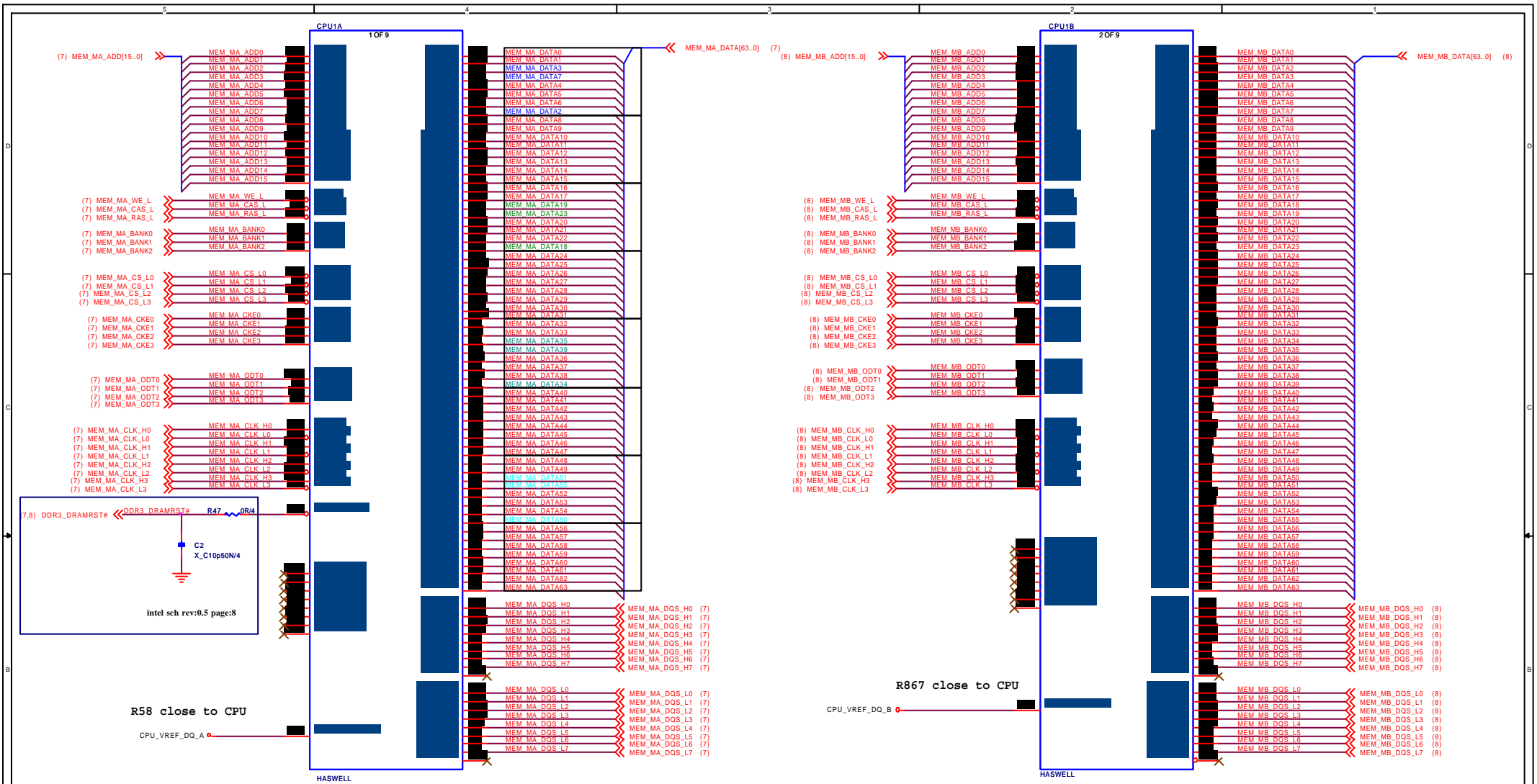


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# MS-7781\_0A Block Diagram





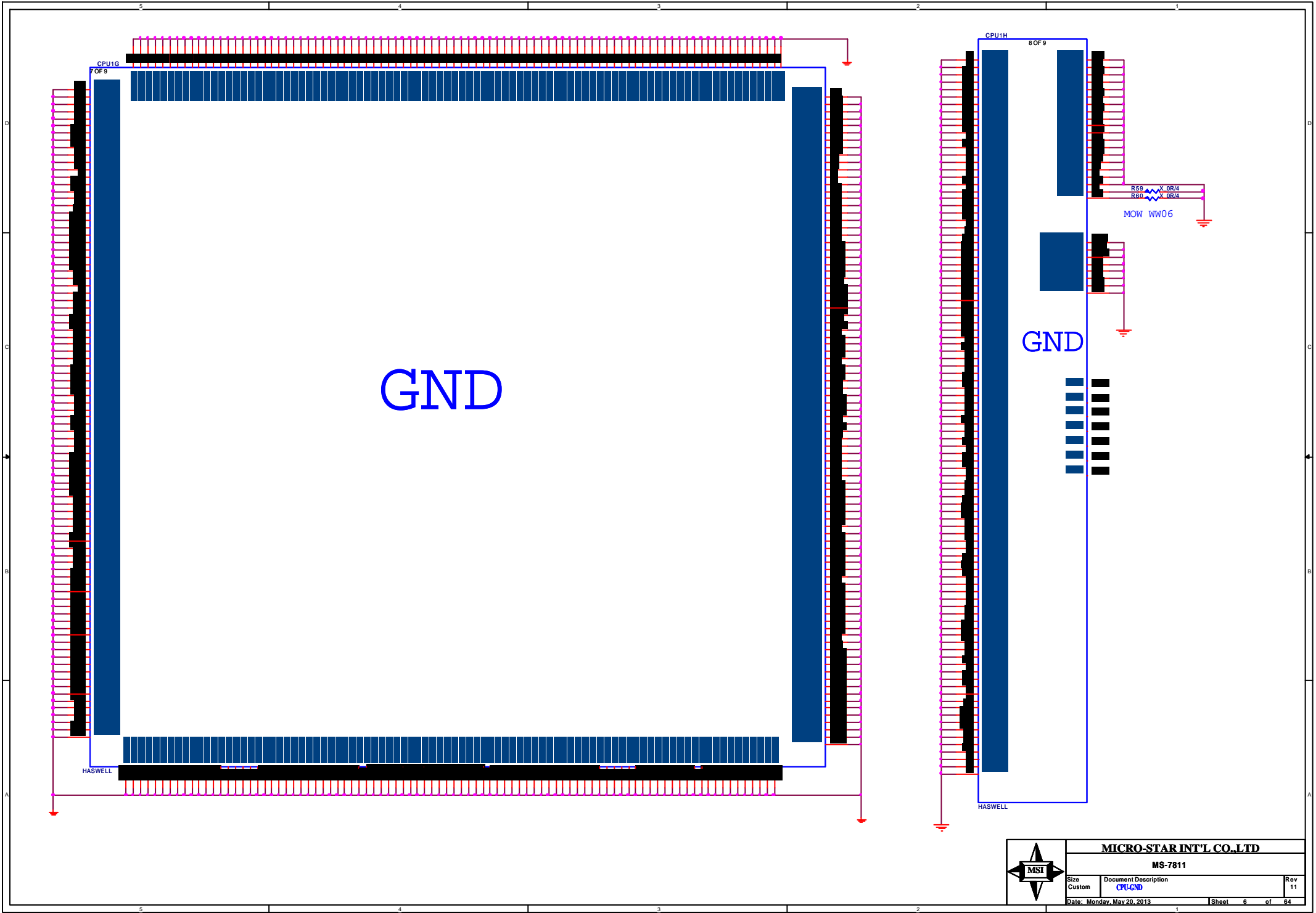


MICRO-STAR INT'L CO.,LTD

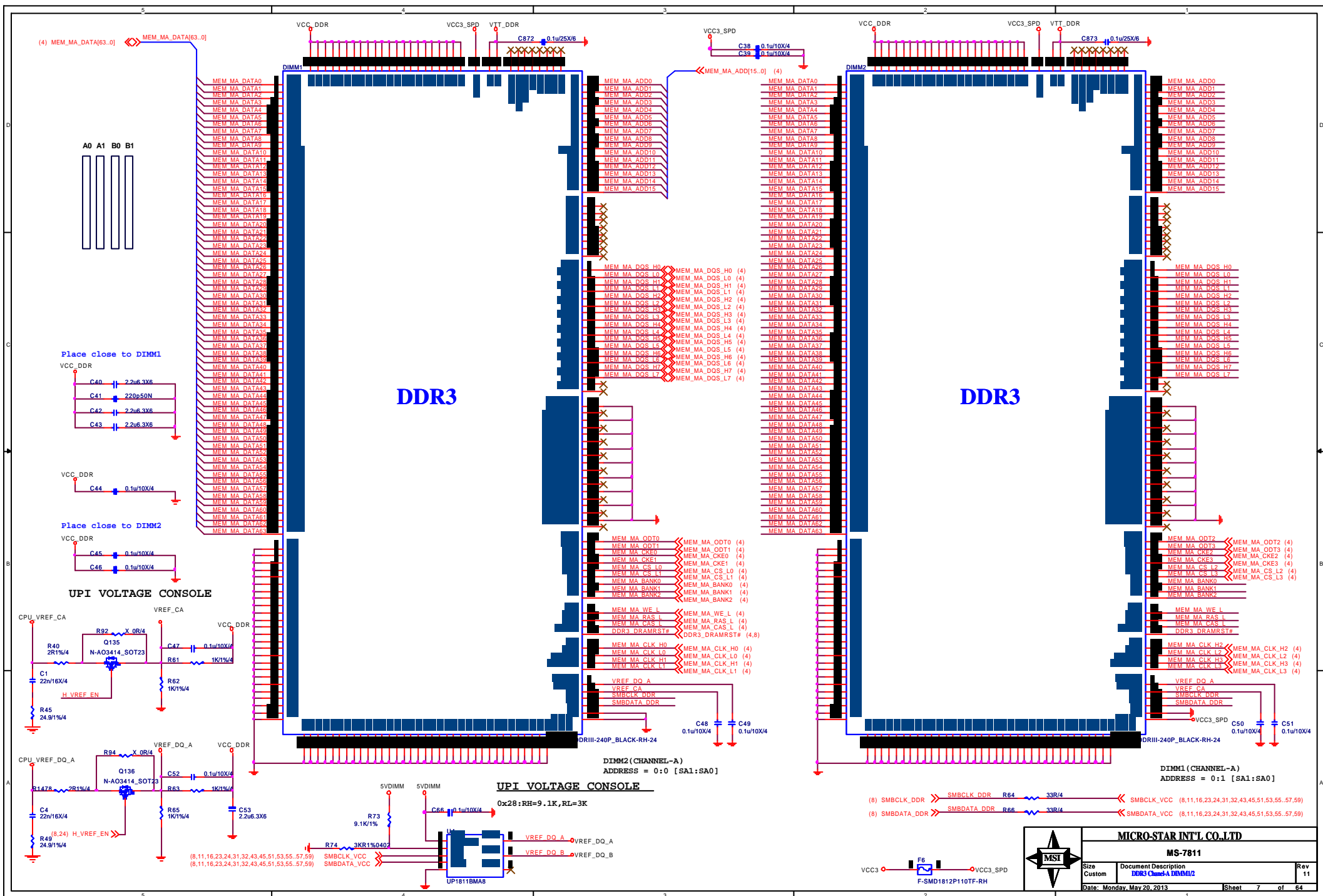
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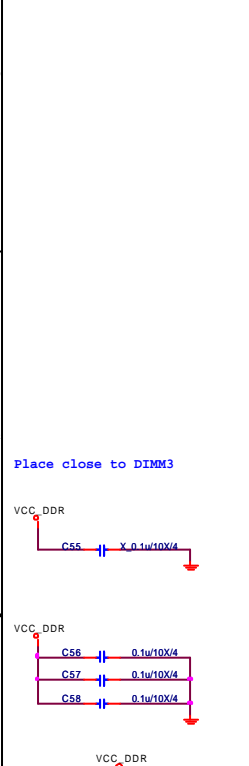


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Custom	CPU-GND		11
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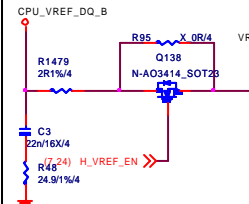
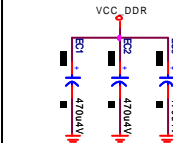


# DDR3 DIMM\_B0

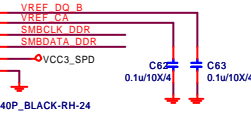
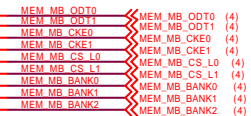
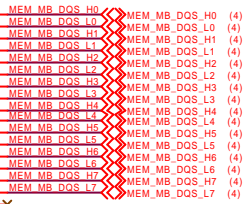
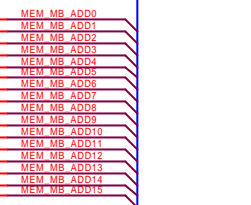
(4) MEM\_MB\_DATA[63..0]



Place close to DIMM3

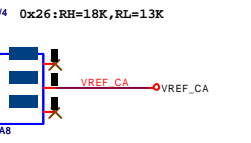


DDR3

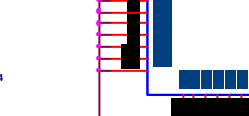
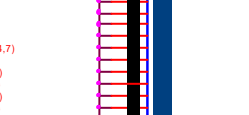
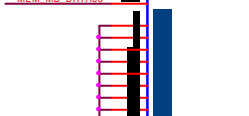
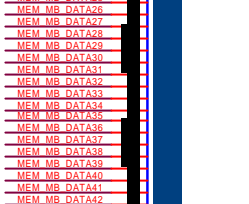
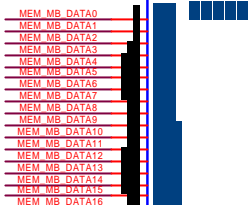


DDR3-240P\_BLACK-RH-24  
DIMM4 (CHANNEL-B)  
ADDRESS = 1:0 [SA1:SA0]

UPI VOLTAGE CONSOLE

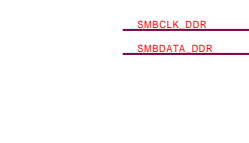


DDR3



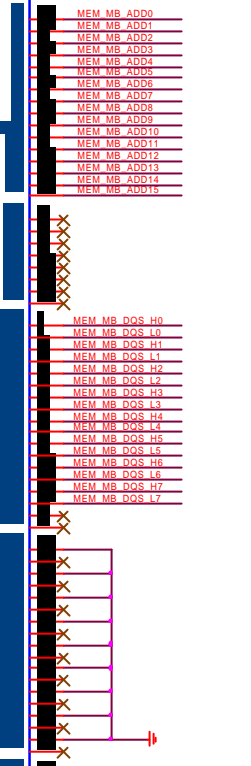
DDR3-240P\_BLACK-RH-24  
DIMM4 (CHANNEL-B)  
ADDRESS = 1:0 [SA1:SA0]

UPI VOLTAGE CONSOLE

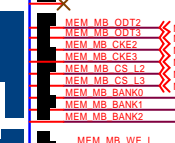


# DDR3 DIMM\_B1

(4) MEM\_MB\_DATA[63..0]

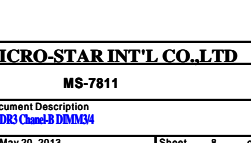


Place close to DIMM3



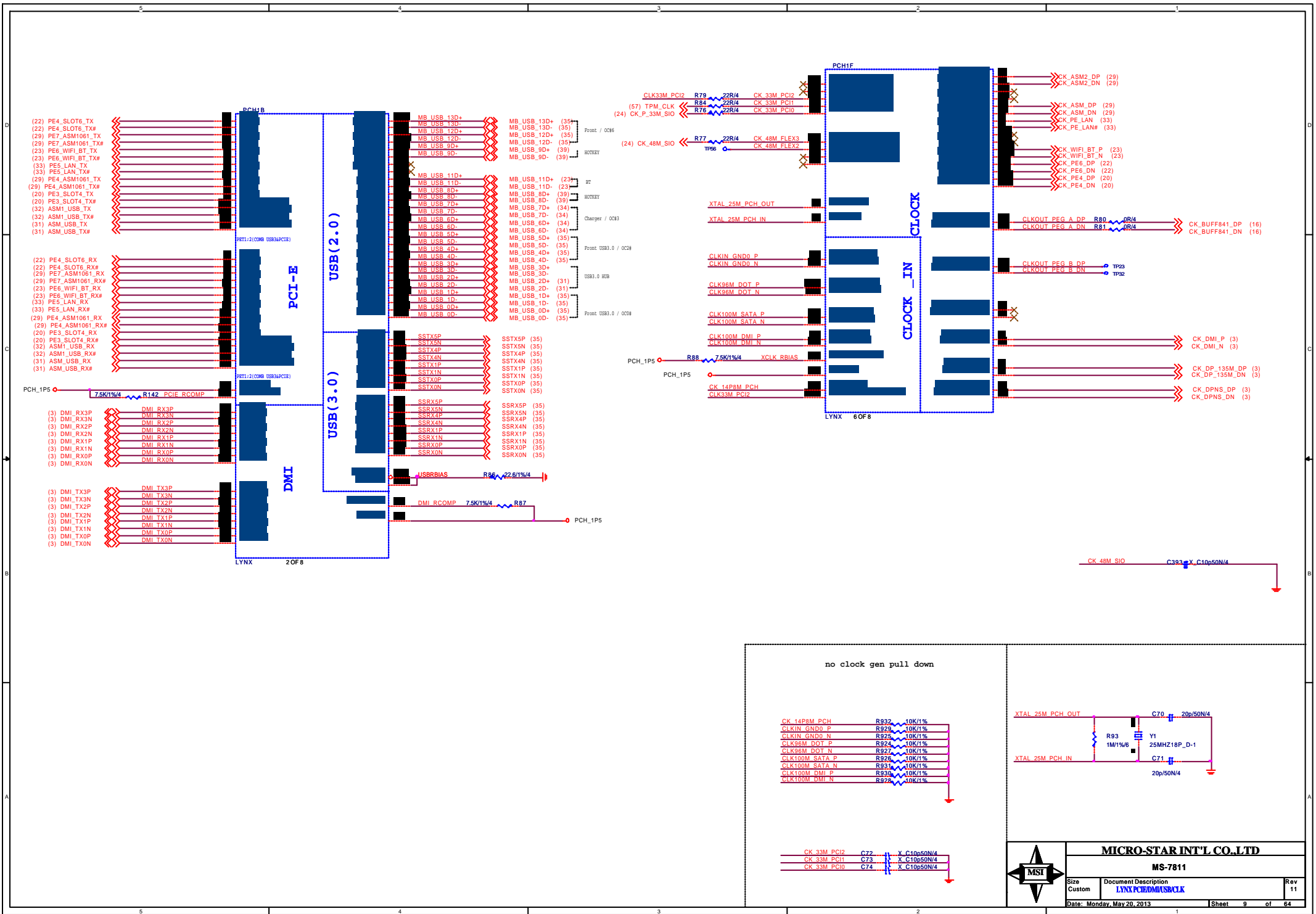
DDR3-240P\_BLACK-RH-24  
DIMM4 (CHANNEL-B)  
ADDRESS = 1:1 [SA1:SA0]

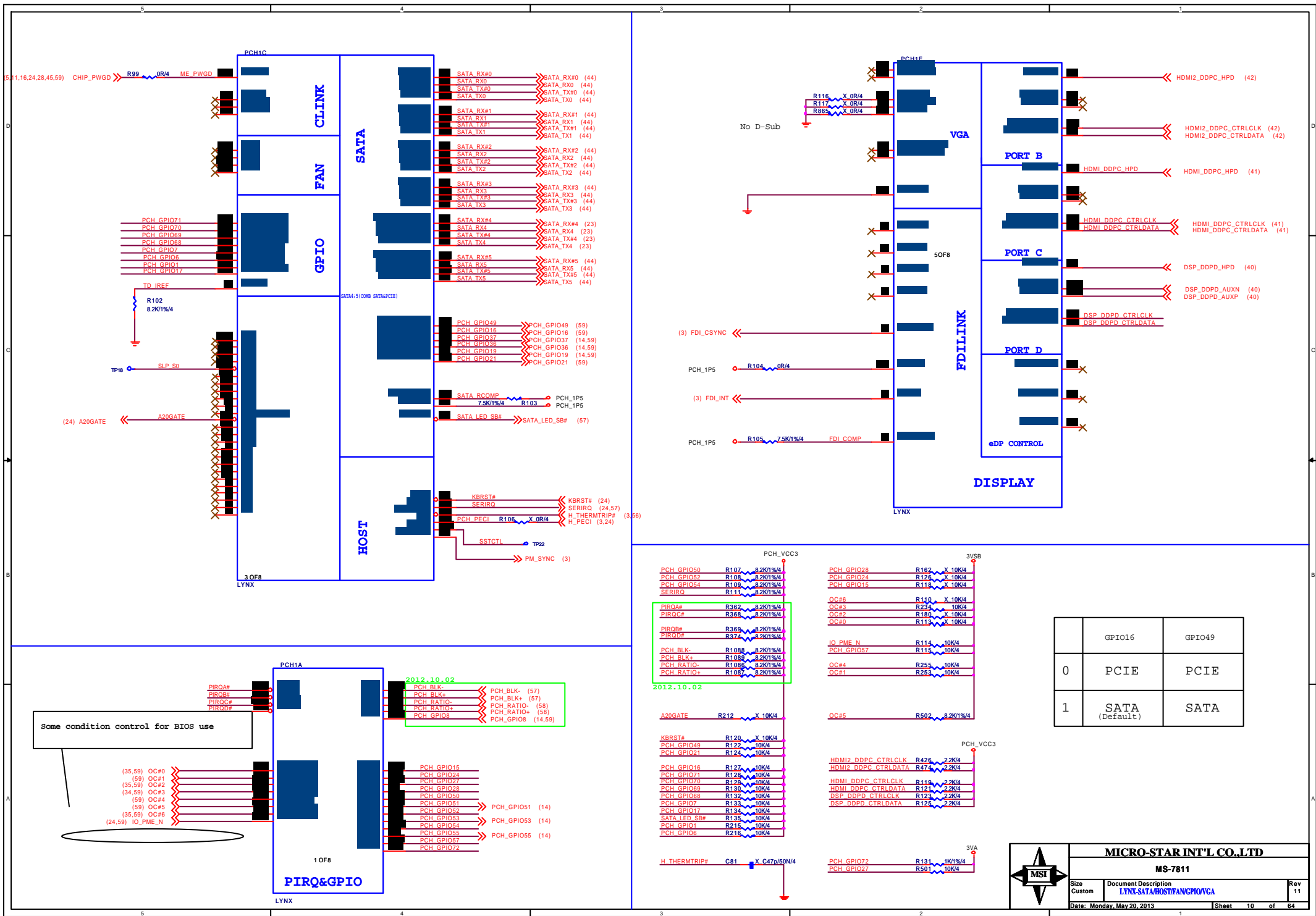
UPI VOLTAGE CONSOLE

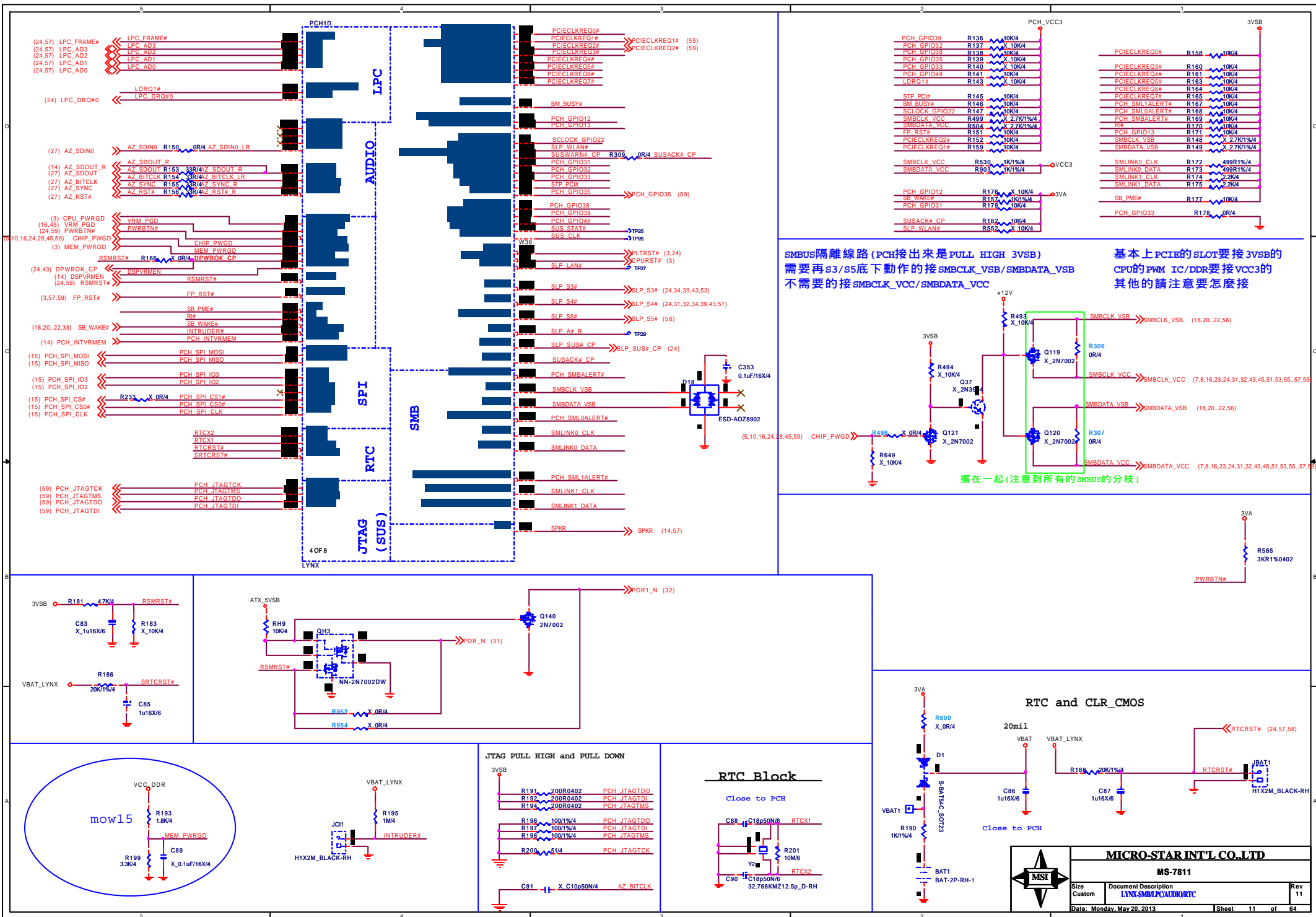


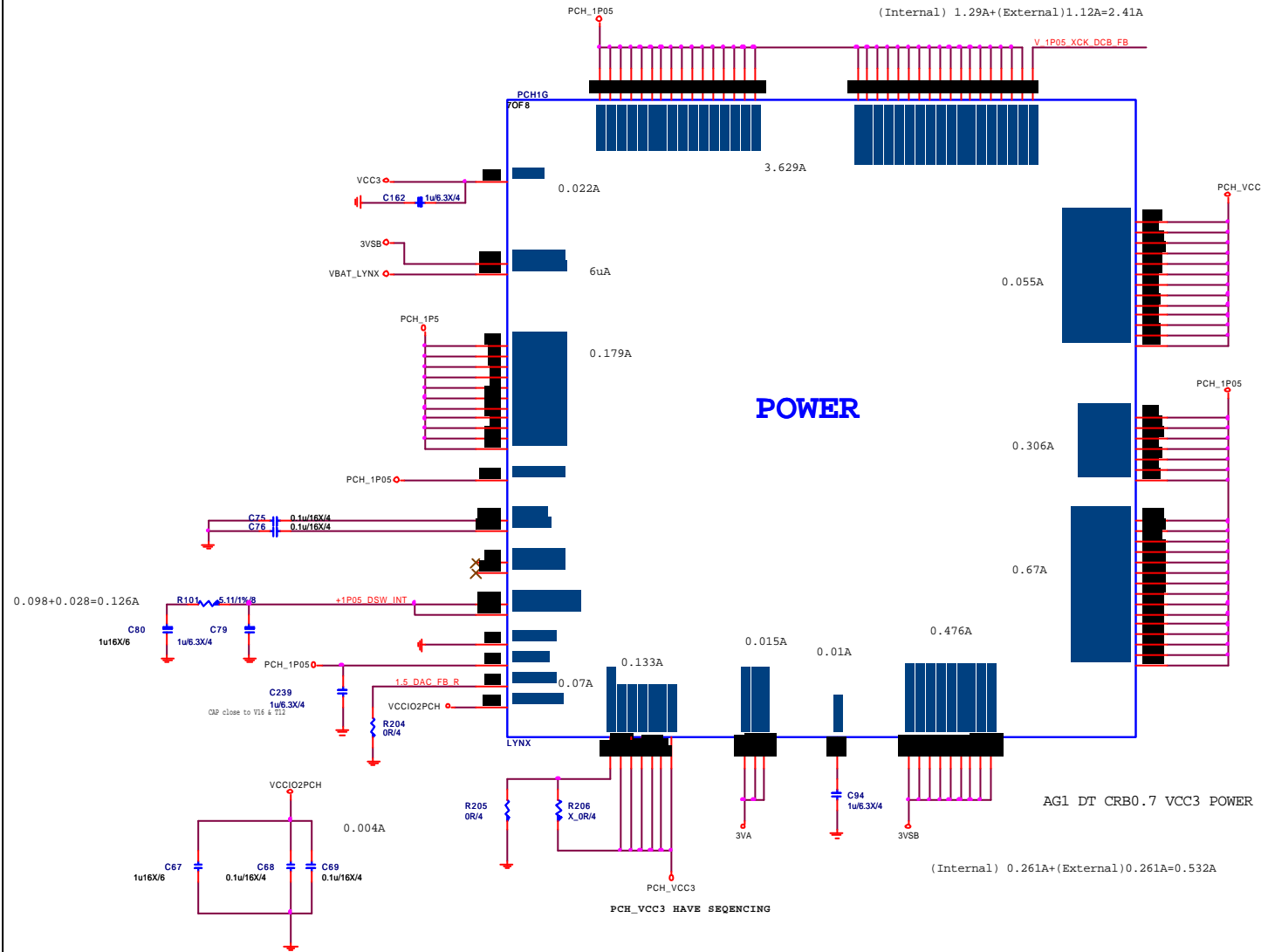
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MS-7811		
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Custom	DDR3 Channel-B DIMM3/4	11
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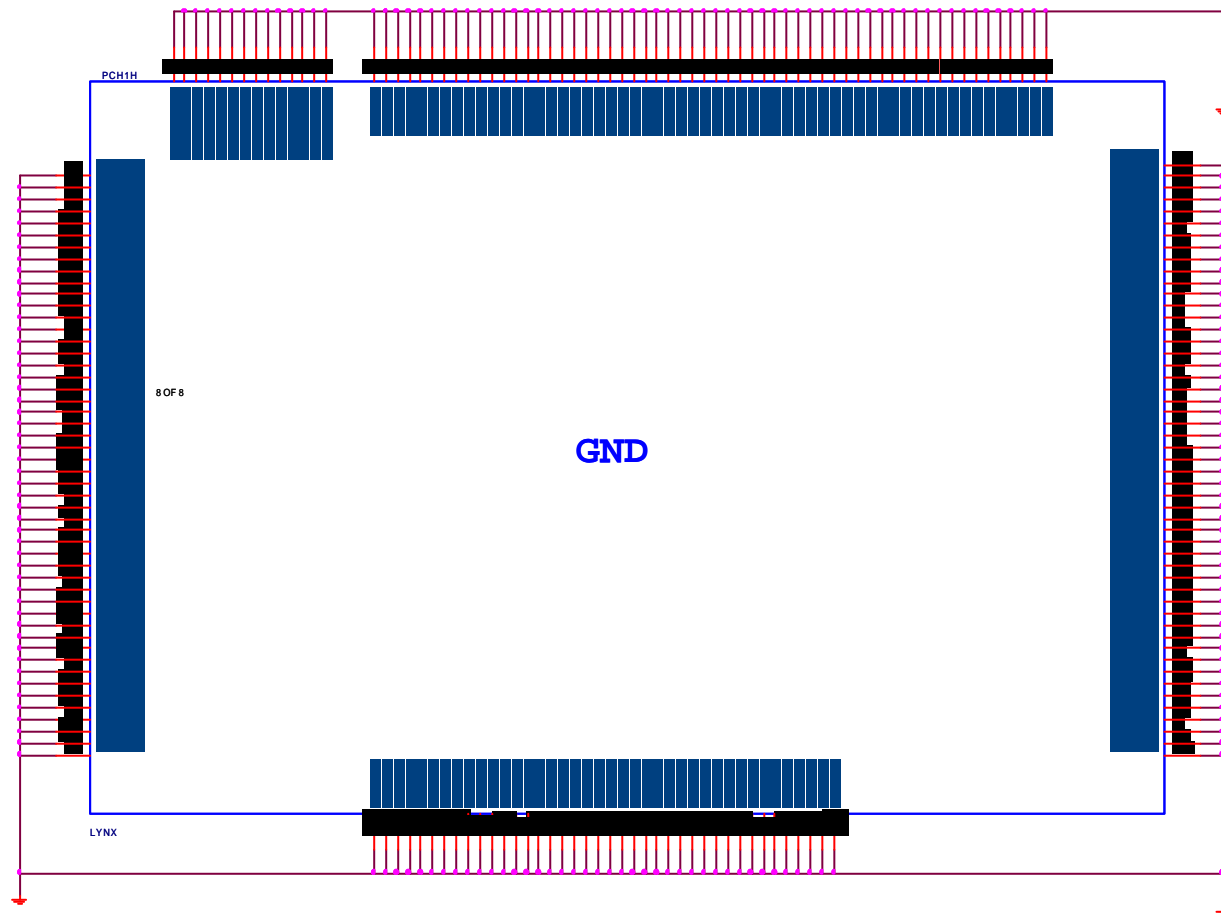


$$(\text{Internal})\ 1.29A + (\text{External})\ 1.12A = 2.41A$$


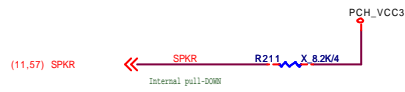
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11

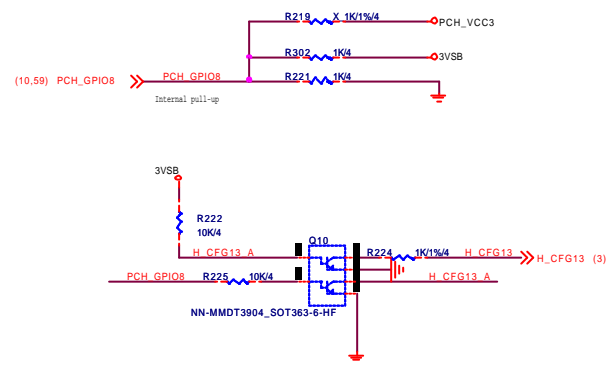
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Custom	LYNX-GND		11
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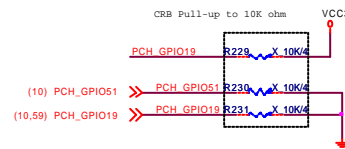


### GPIO8



### GPIO19 & GPIO51

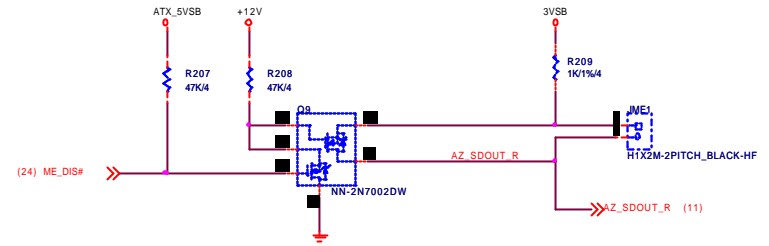
BOOT DEVICE	GPIO51	GPIO19
LPC	0	0
SPI	1	1



Default (SPI):  
Left both SATA1GP/GPIO19 and GPIO51 floating.  
No pull up required.

Boot from PCI:  
Connect SATA1GP/GPIO19 to ground with 1k  
Ohm pull-down resistor.  
Leave GPIO51 Floating.

Boot from LPC:  
Connect both SATA1GP/GPIO19 and GPIO51 to  
ground with 1k Ohm pull-down resistor.



### GPIO55

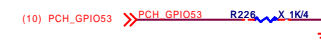
#### TOP BLOCK SWAP MODE



GPIO55  
Default Mode:  
Internal pull-up.

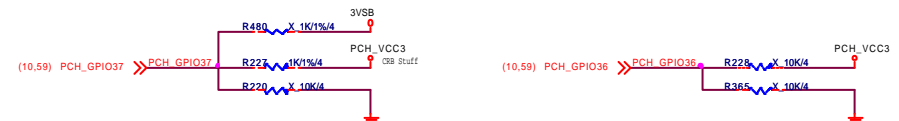
Top Block Swap Mode:  
Connect to ground with 4.7k Ohm weak pulldown  
resistor.

### GPIO53



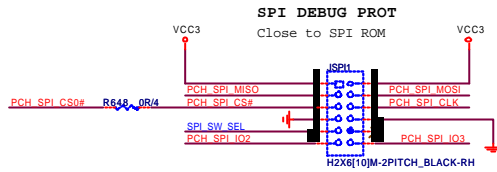
GPIO53  
Connect to ground with 1k Ohm pull-down  
resistor.

### GPIO36 & GPIO37

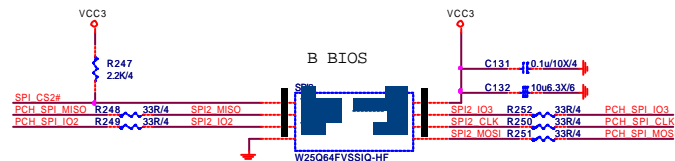
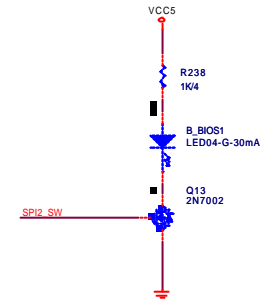
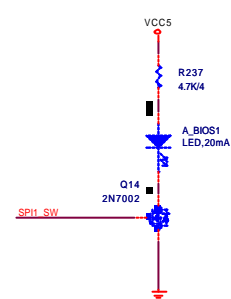
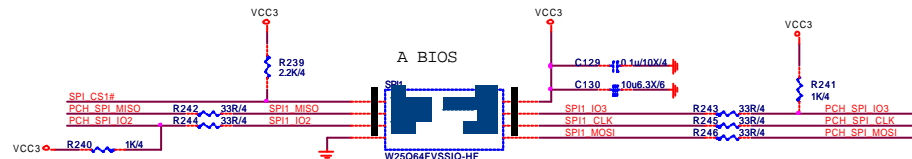
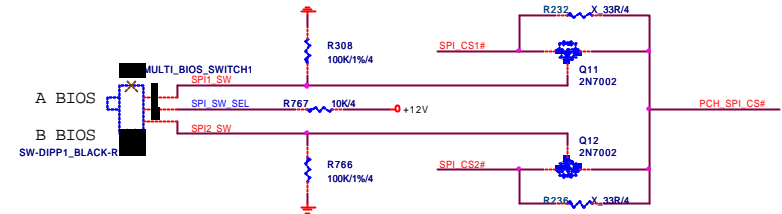


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Custom	LYNX STRAPS	11	
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(11) PCH\_SPI\_CS0# << PCH\_SPI\_CS0#  
(11) PCH\_SPI\_CS# << PCH\_SPI\_CS#  
(11) PCH\_SPI\_MOSI << PCH\_SPI\_MOSI  
(11) PCH\_SPI\_MISO << PCH\_SPI\_MISO  
(11) PCH\_SPI\_CLK << PCH\_SPI\_CLK  
(11) PCH\_SPI\_IO2 << PCH\_SPI\_IO2  
(11) PCH\_SPI\_IO3 << PCH\_SPI\_IO3



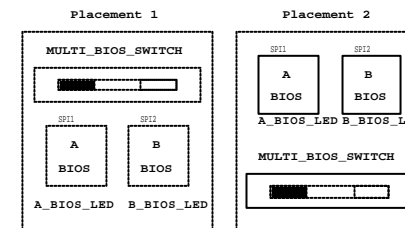
Part Number:N31-2061341-H06



### SPI FLASH ROM

Place close to SB.

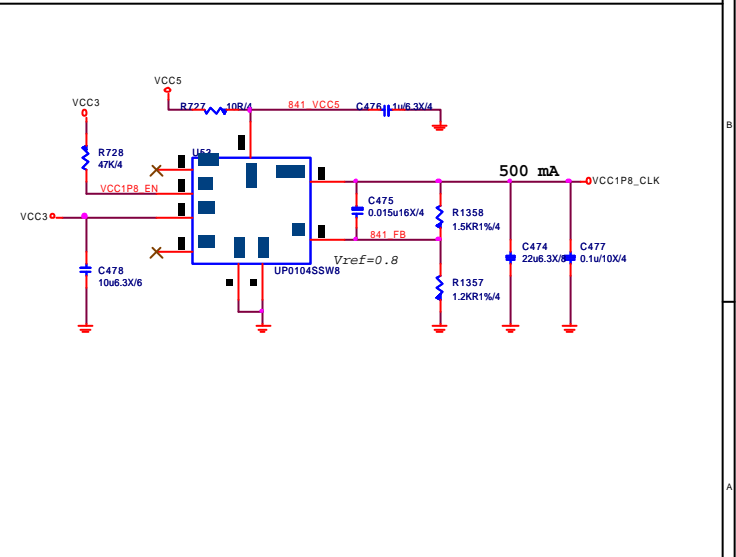
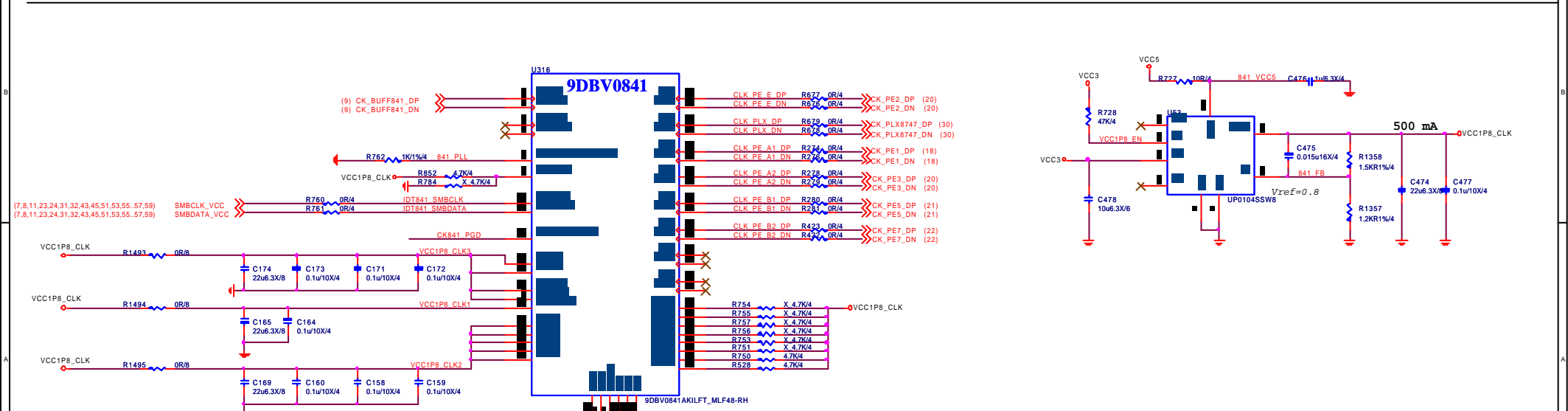
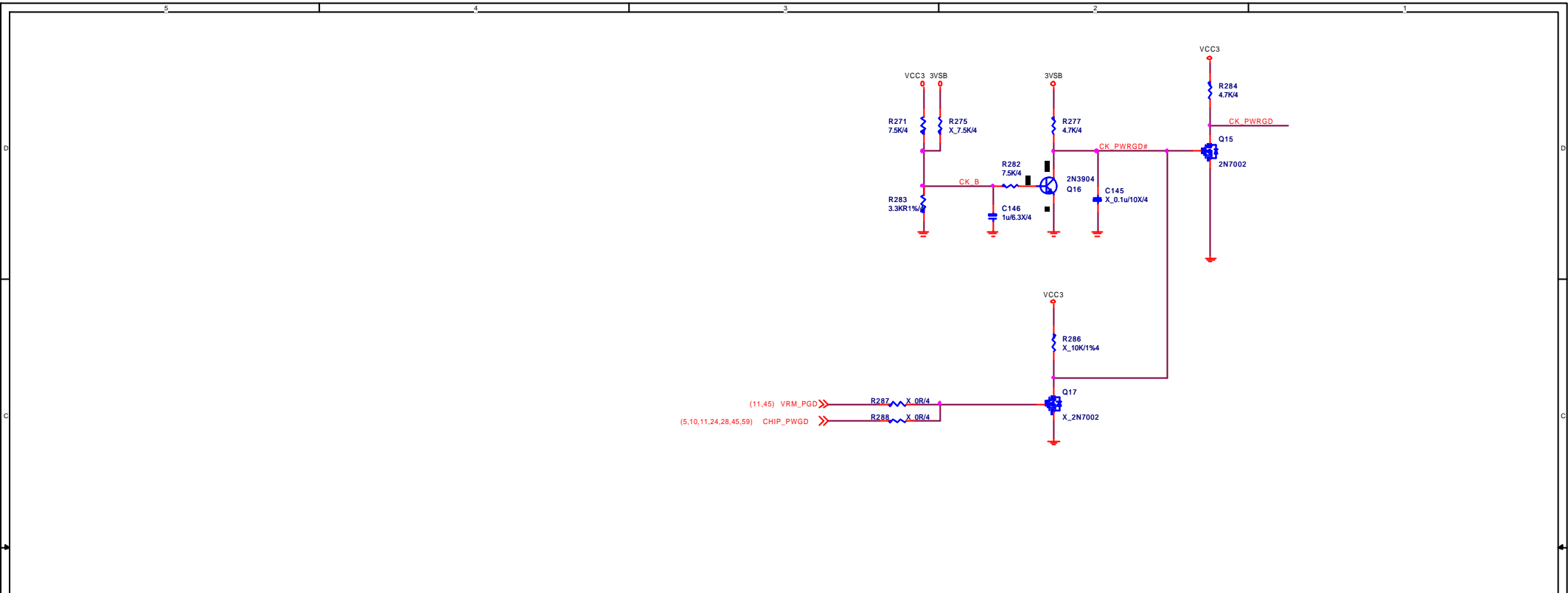
\*SPI\_CLK & SPI\_MOSI must be length matched to within 50nails.  
\*SPI\_CLK & SPI\_CS0 must be length matched to within 50nails.



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**MS-7811**

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Custom	Dual BIOS	11
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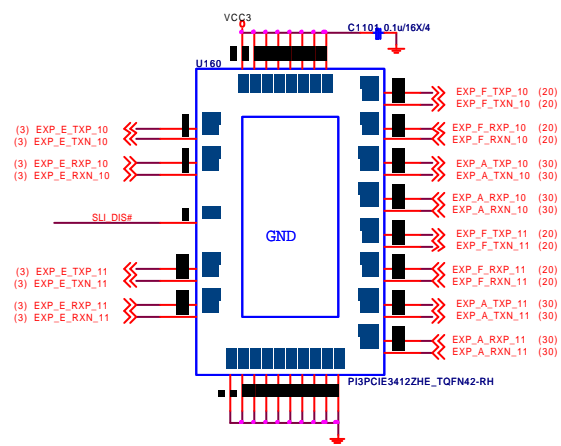
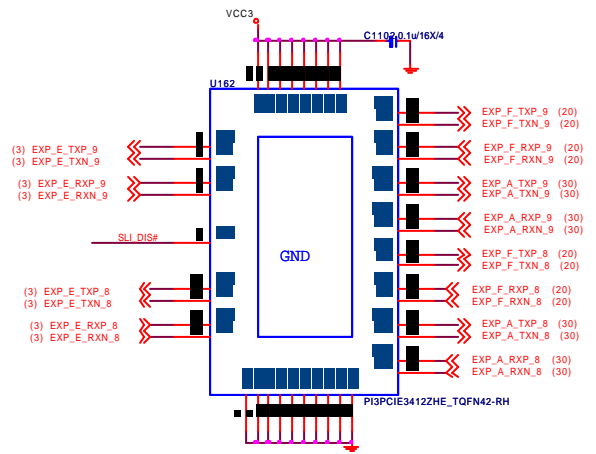
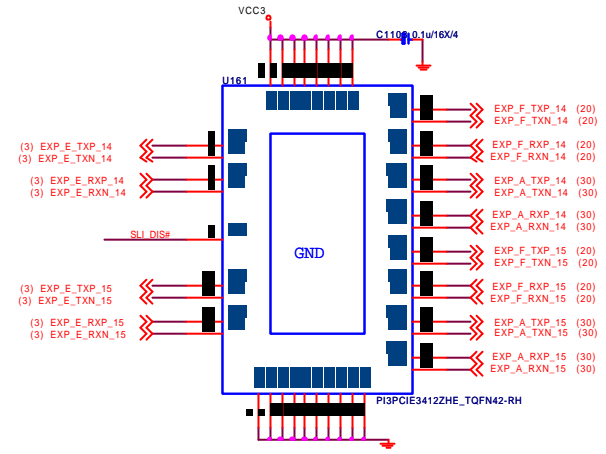
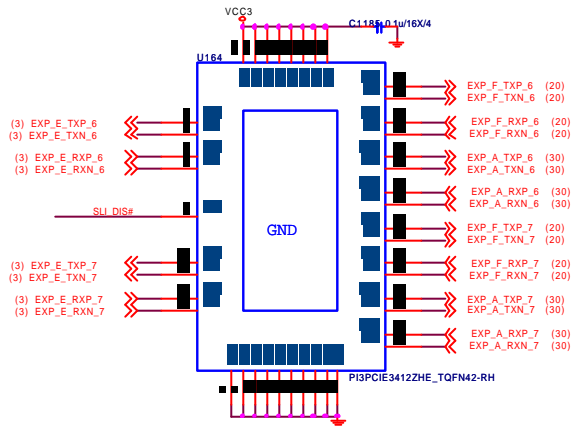
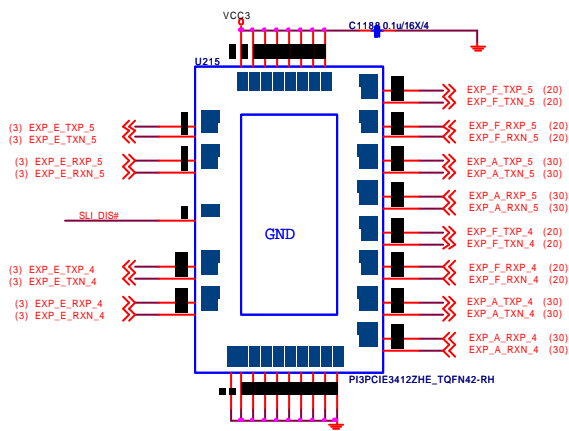
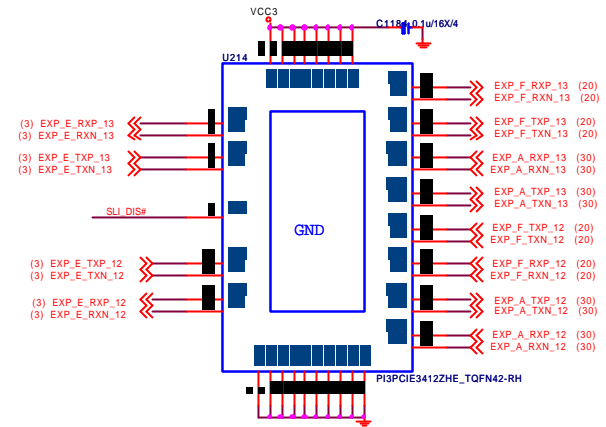
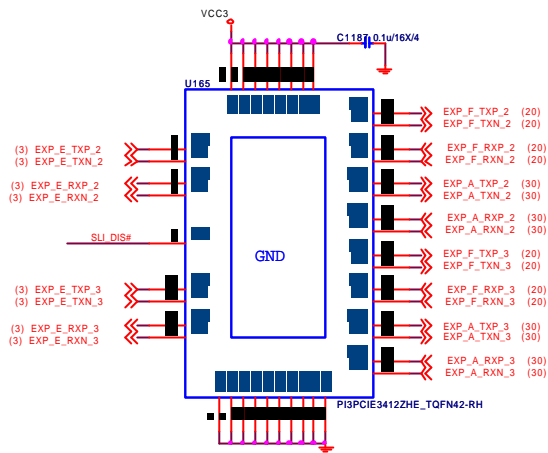
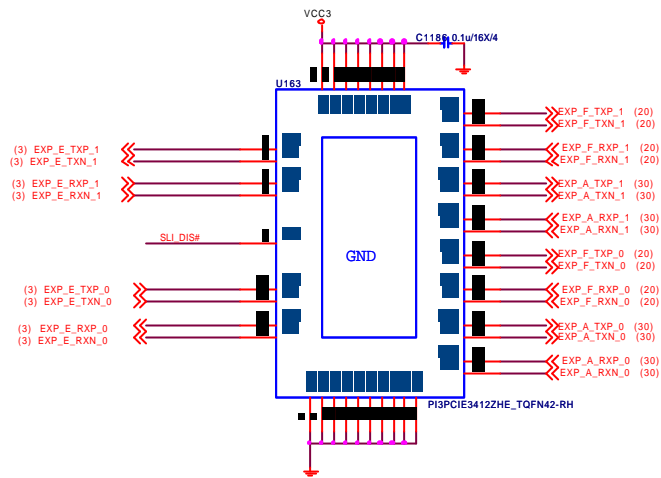


SEPC REMOVE



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	Low	High
SLI_DIS#	Non-SLI	SLI
SEL	b	C



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(Share with PCI E x16 Slots)

Trace width > 200 mils



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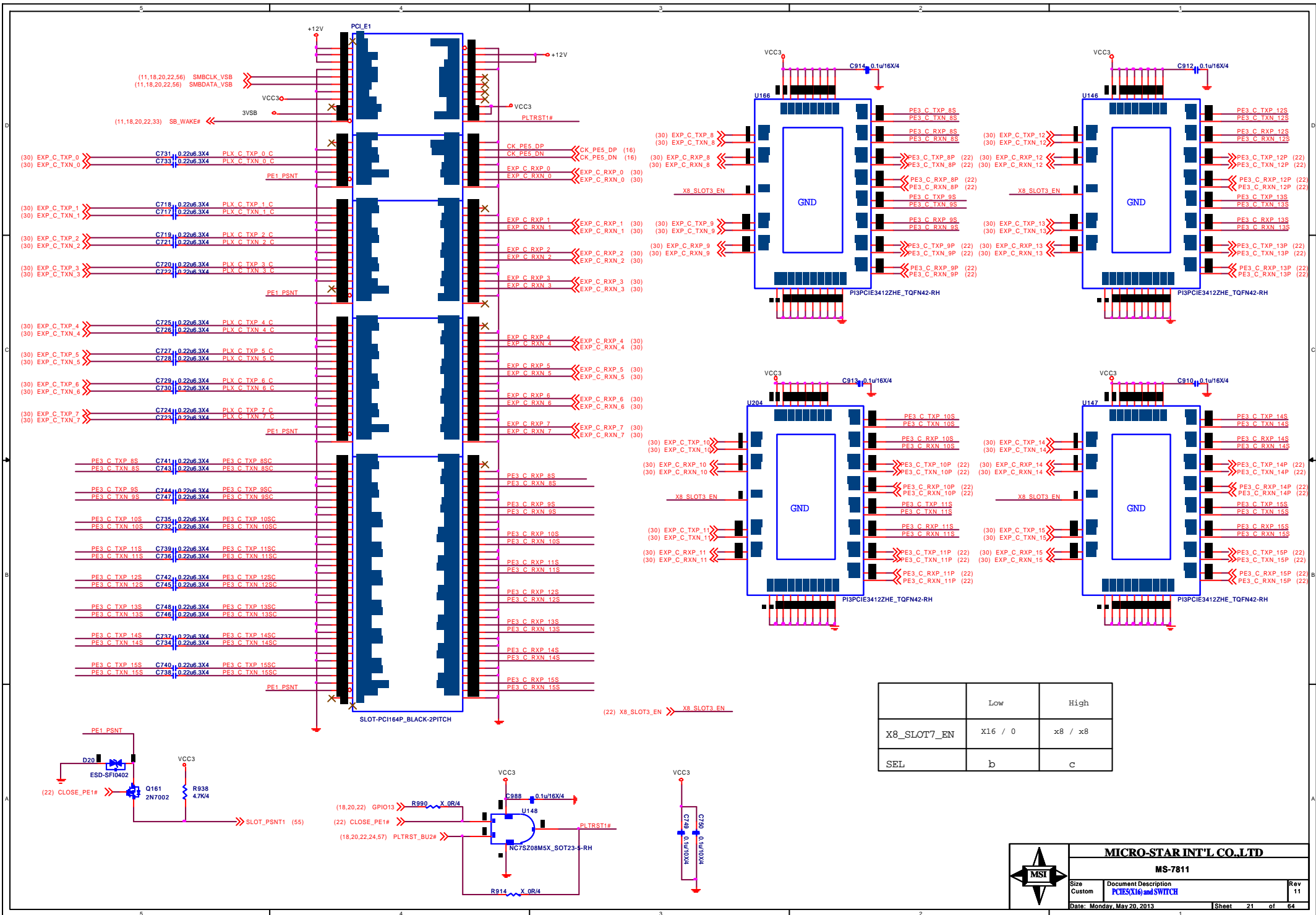
MS-7811

Size	Document Description
Custom	PCIE2(x16)PCIE3(x8)PCIE4(x1)

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	Re
	1

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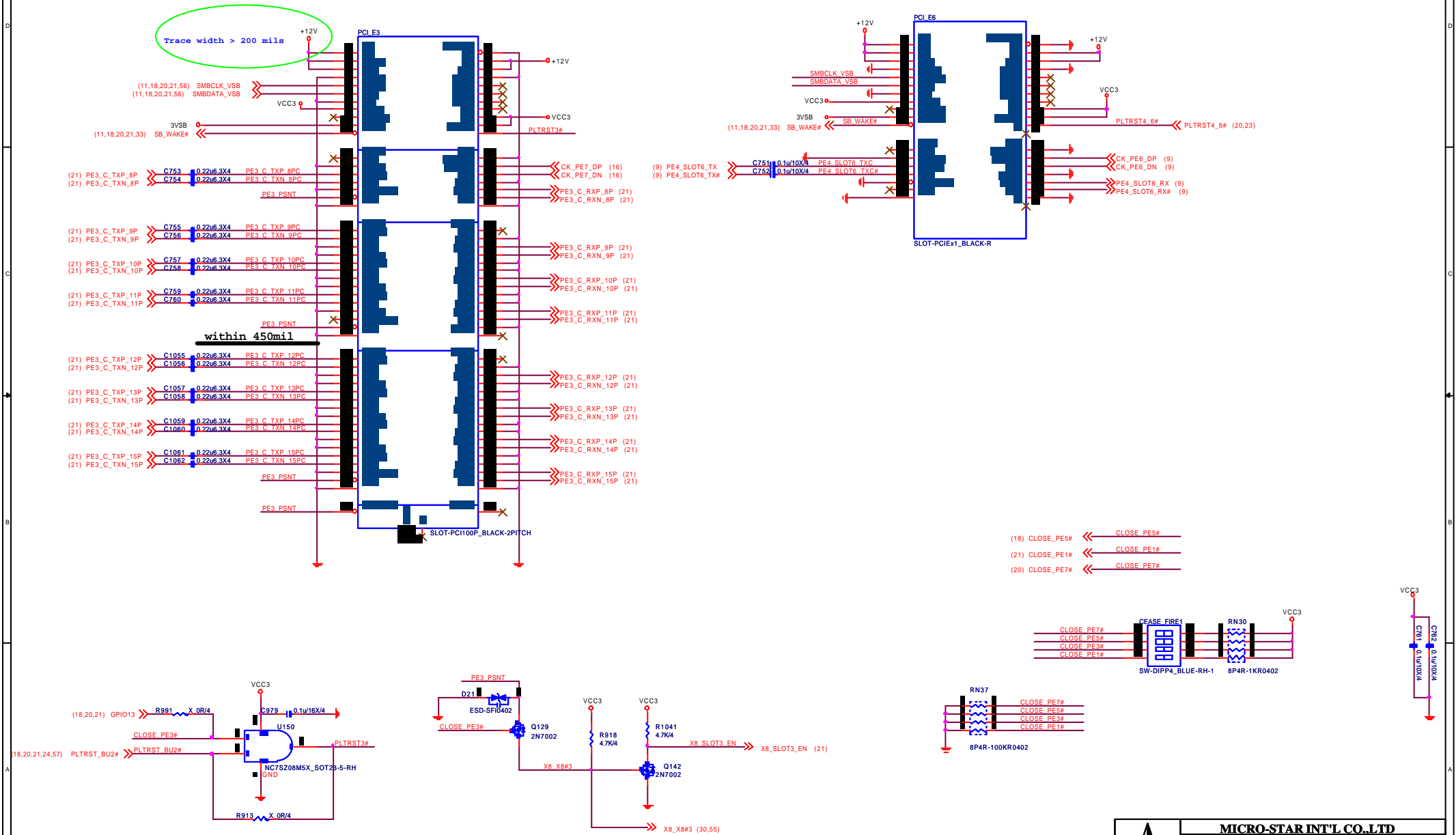


	Low	High
X8_SLOT7_EN	x16 / 0	x8 / x8
SEL	b	c



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Custom	PCIE(X16) and SWITCH	11
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## PCI\_Express X8 Slot( Shaded by X16)



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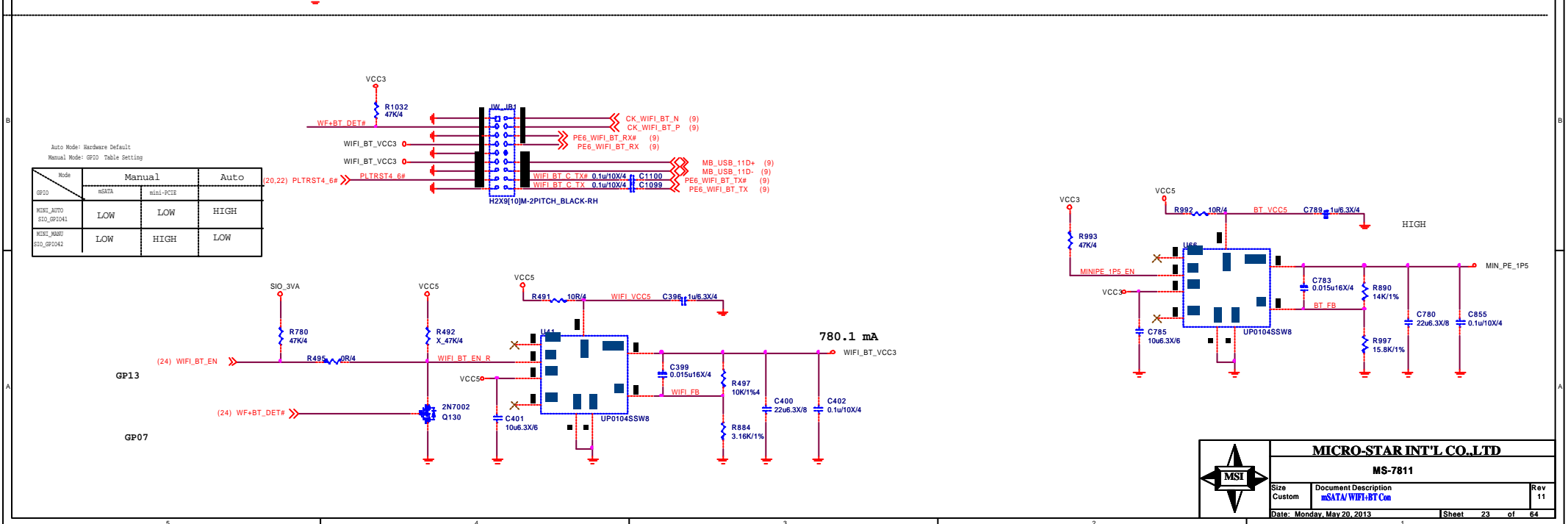
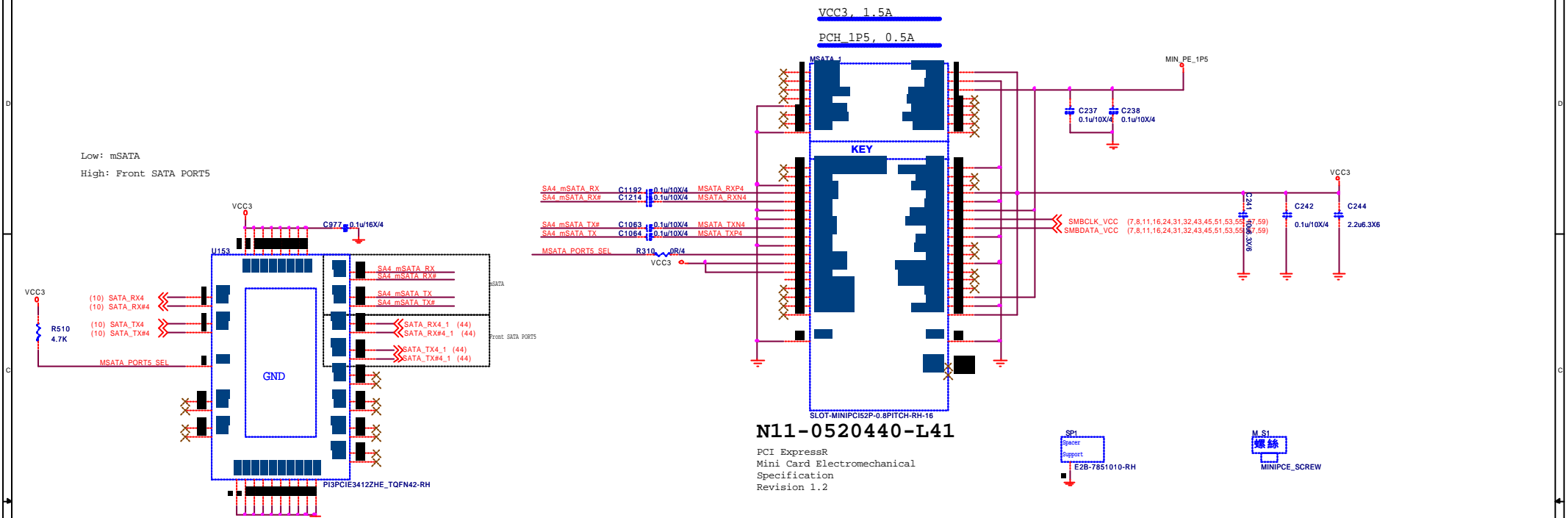
MS-7811

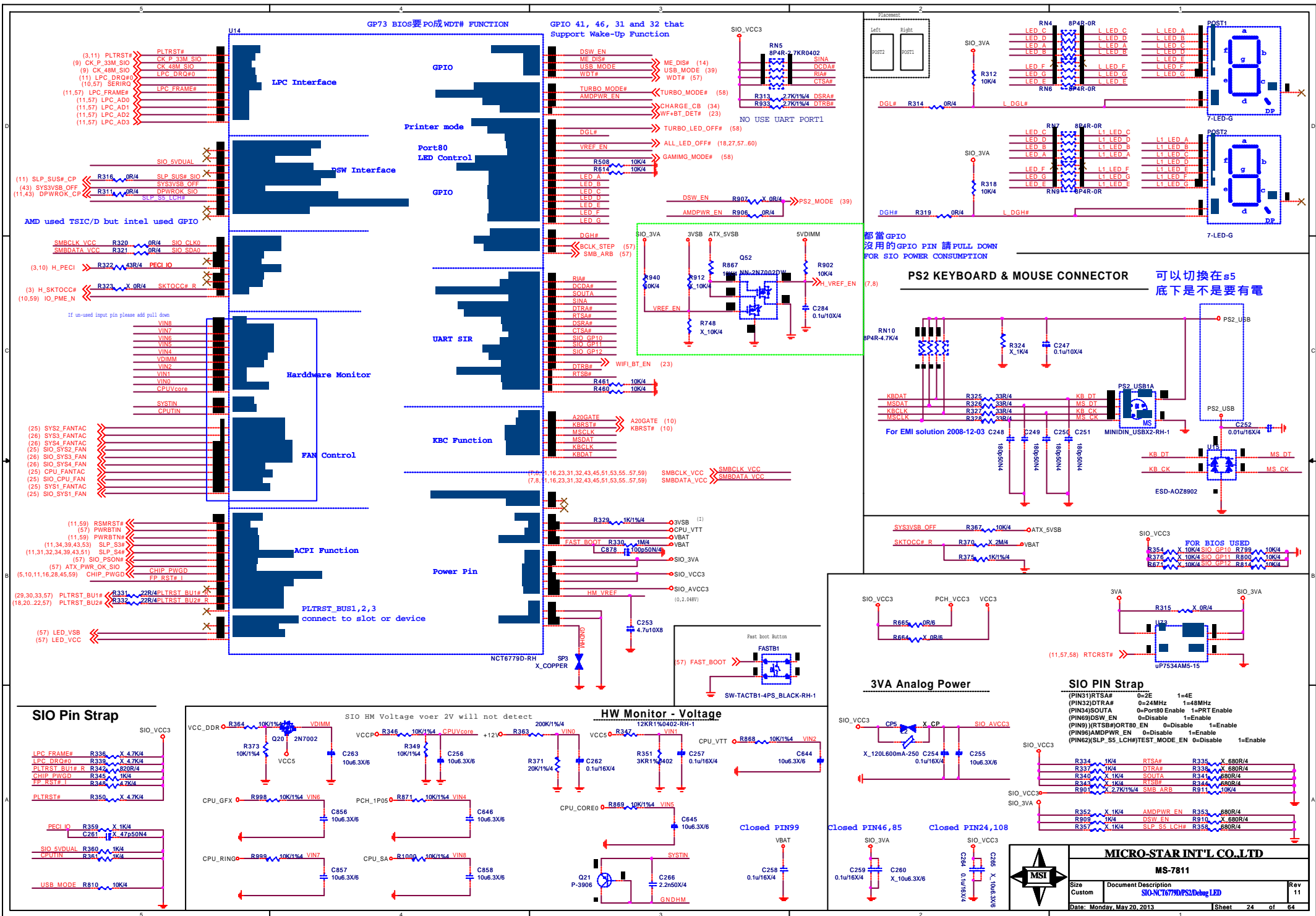
Size	Document Description
Custom	PCIE6(X1)&PCIE7(X8) SLOT

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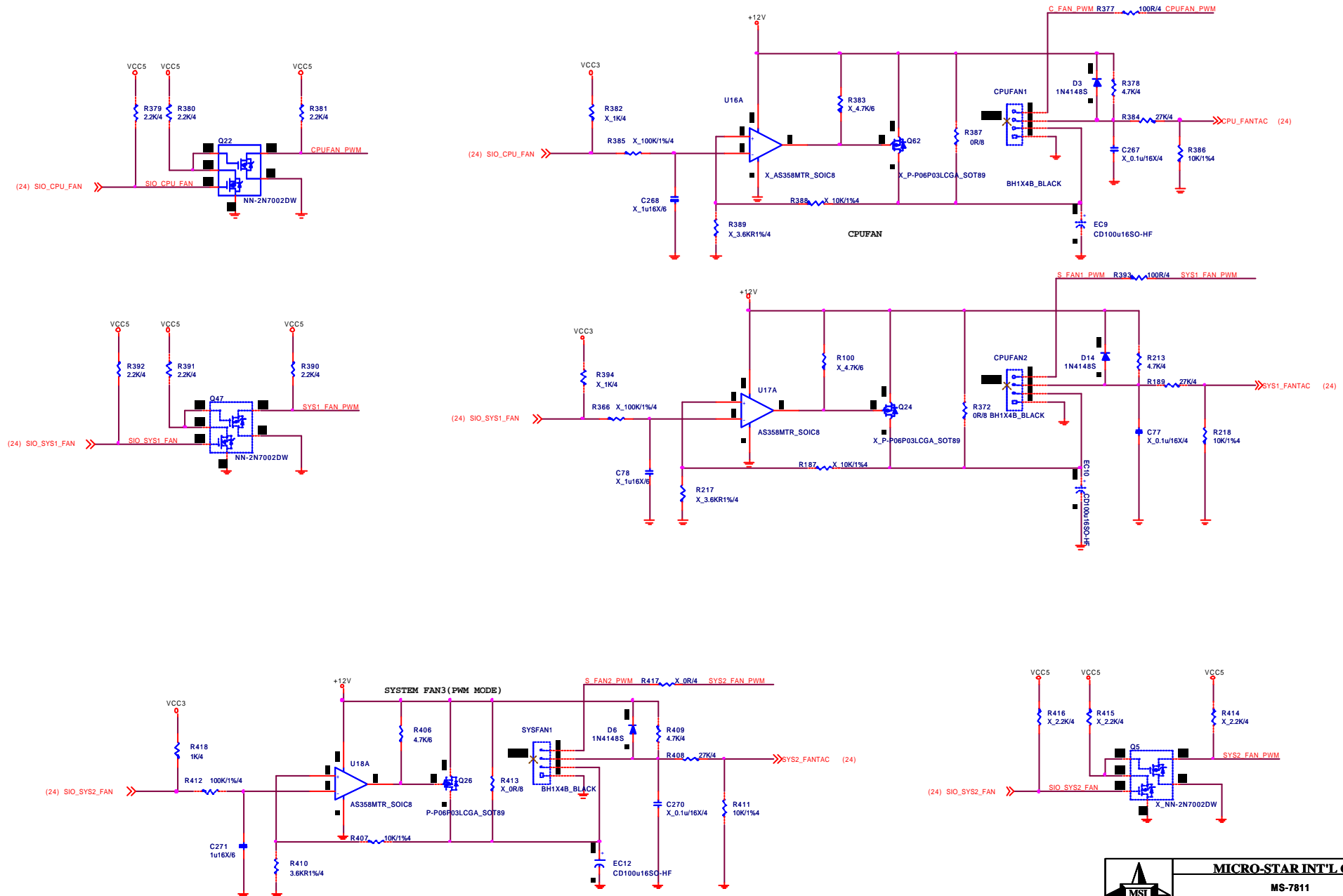
# mSATA Only/(Long Card)







# Type E : 4 PIN CPU FAN FROM SIO (Smart Fan/PWM MODE )(FOR NCT6776/5533)

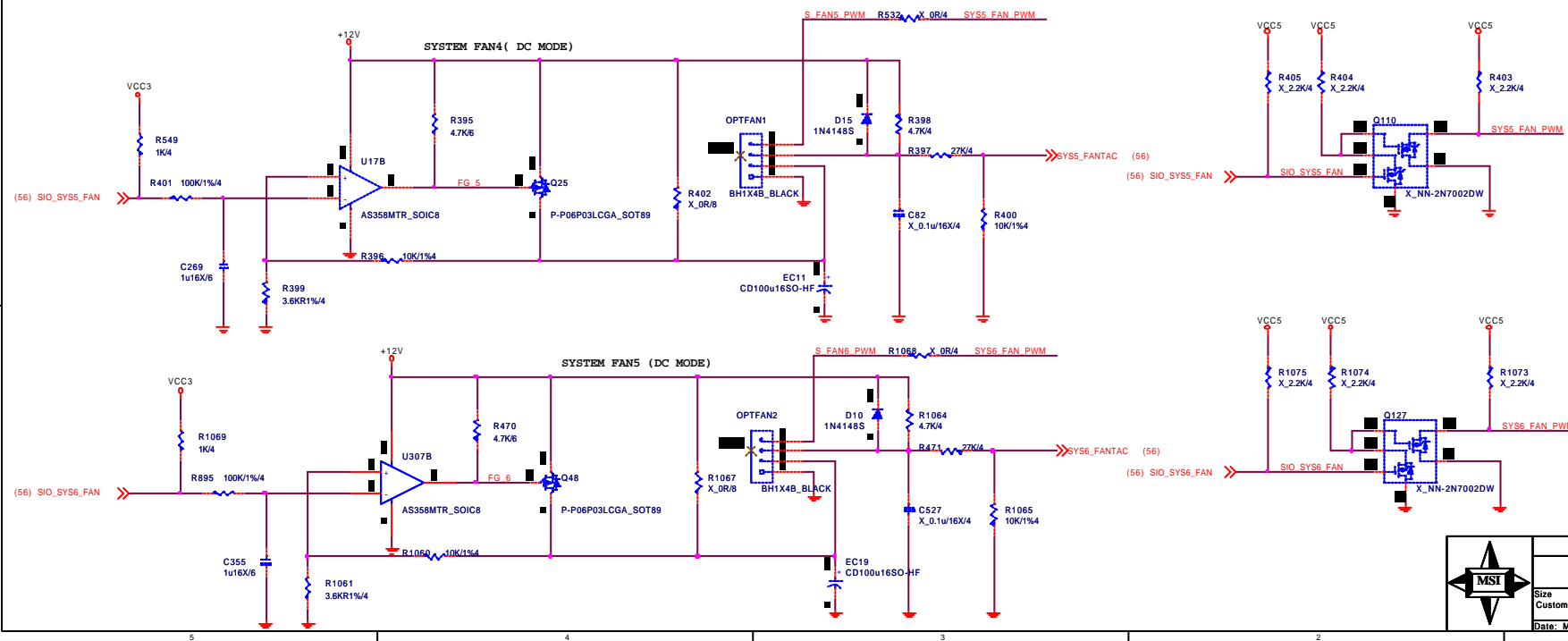
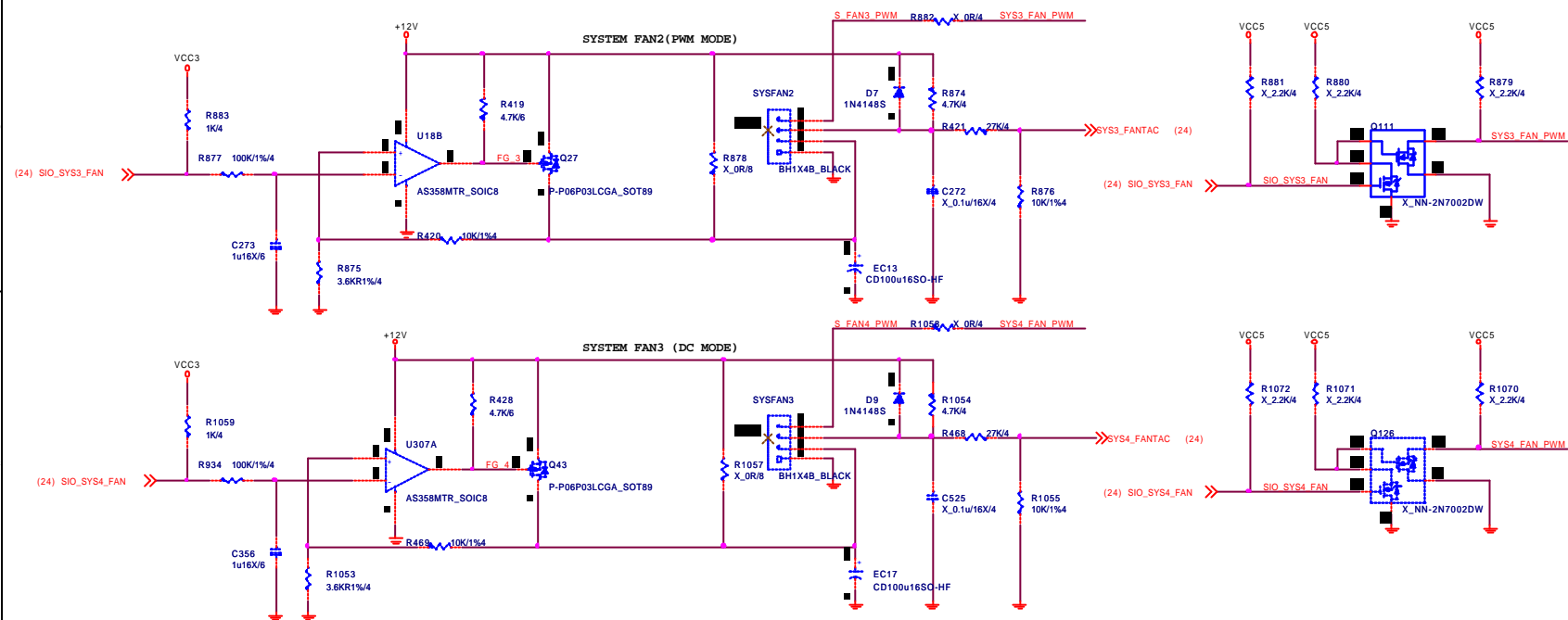


**MICRO-STAR INT'L CO.,LTD**

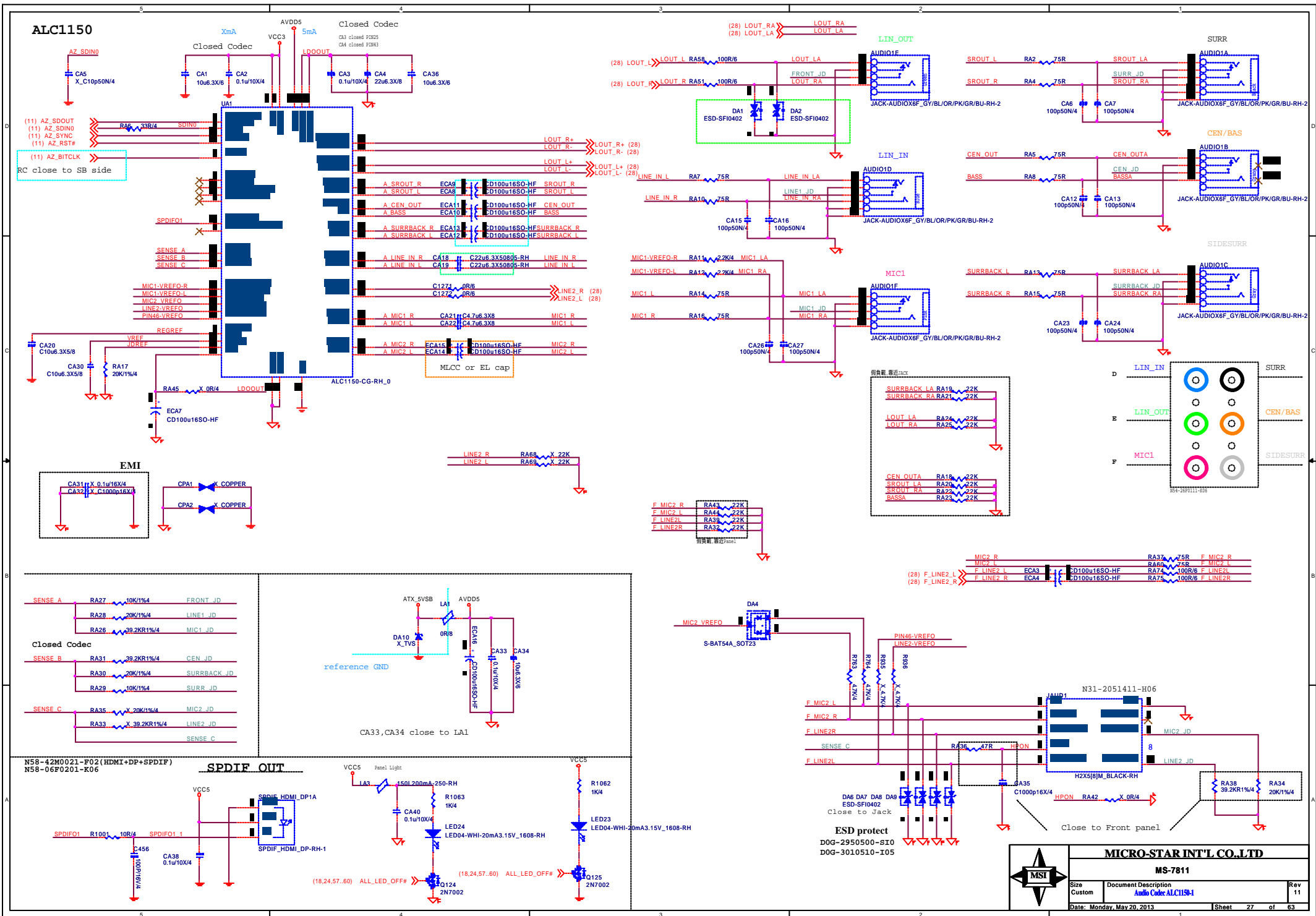
**MS-7811**

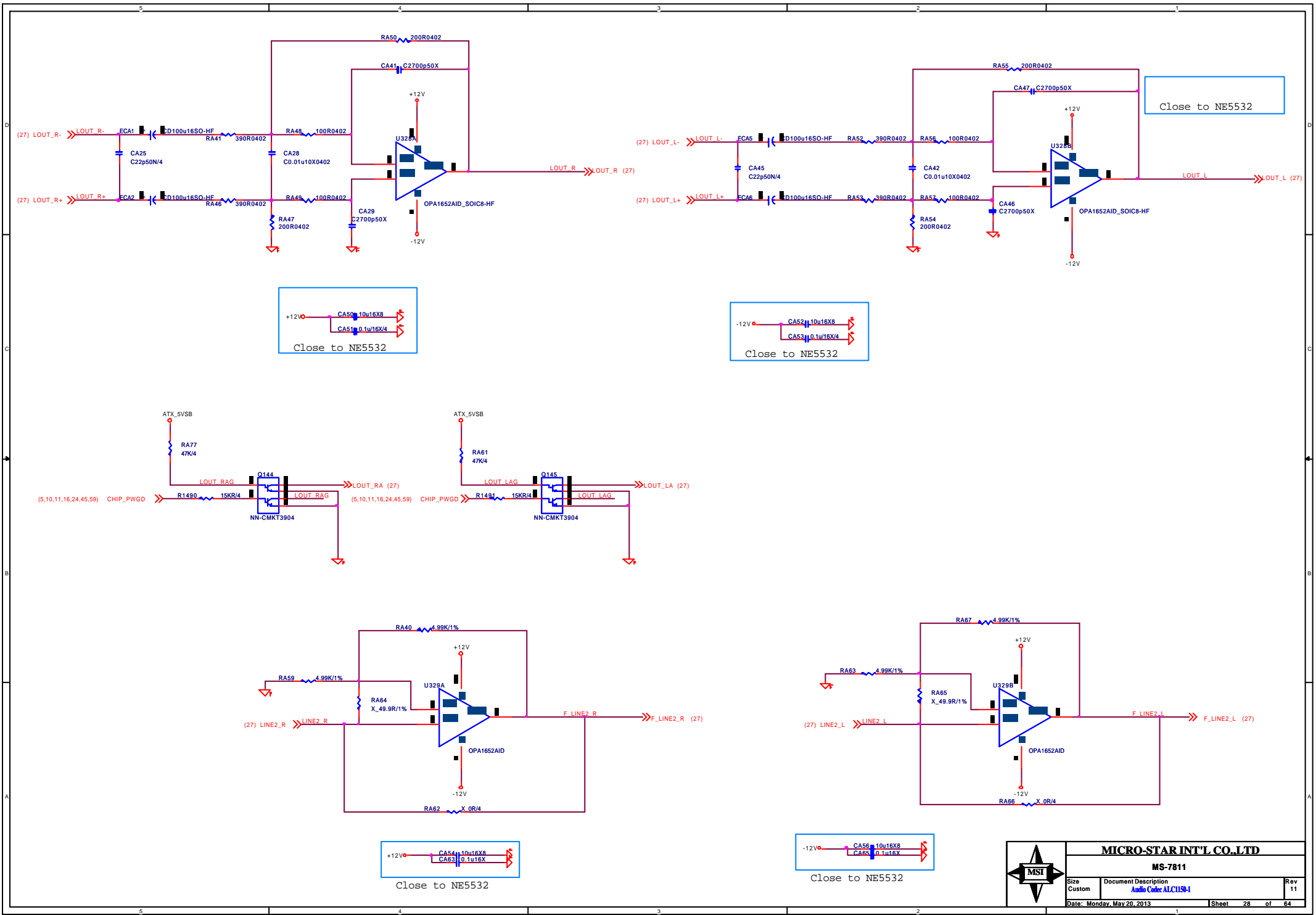
Size	Document Description	Rev
Custom	CPU FAN & SYSFAN1-2	11
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# Type F : 4 PIN SYSTEM FAN FROM SIO (Smart Fan/PWM MODE ) (FOR NCT6776/5533)



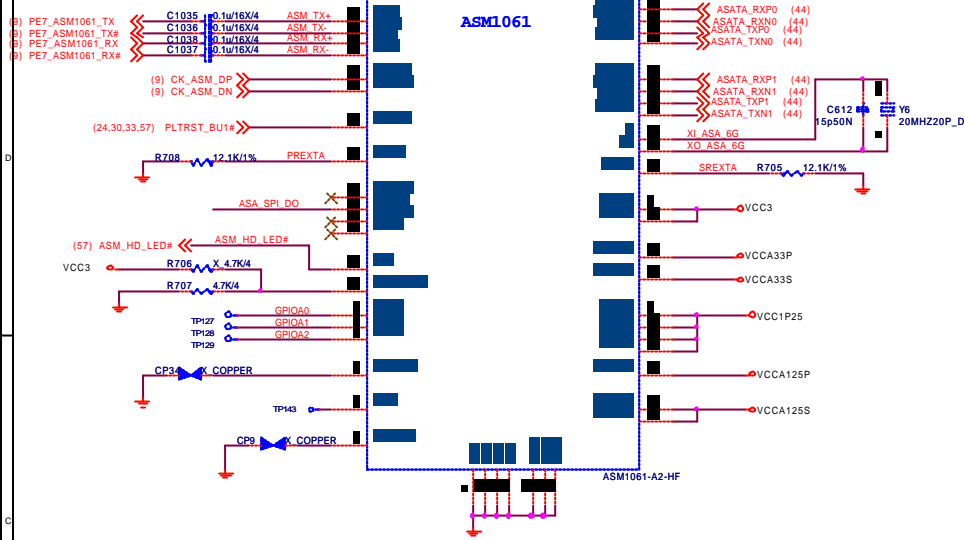
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Custom	SYNFAN3-4	11
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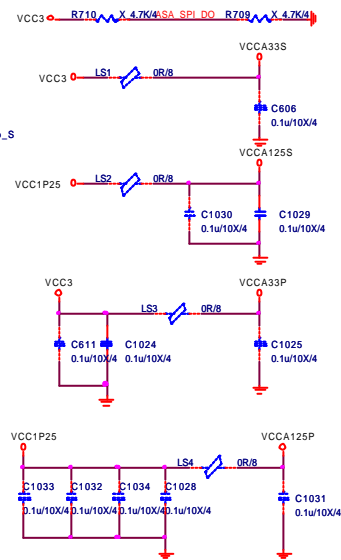


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Custom	Audio Codec ALC1194	11
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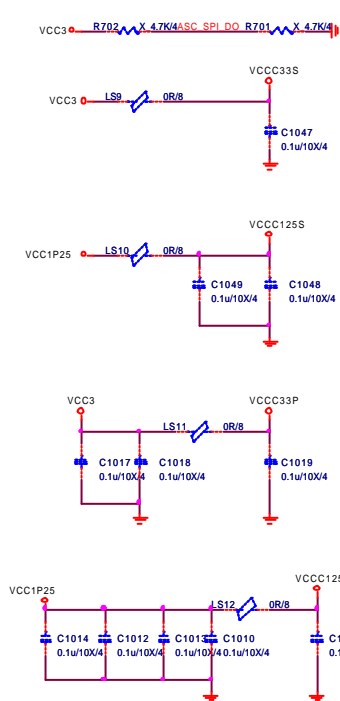
# ASM1061-A



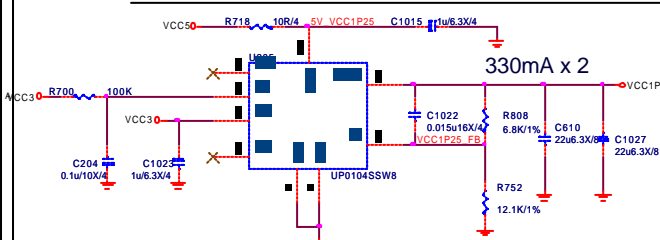
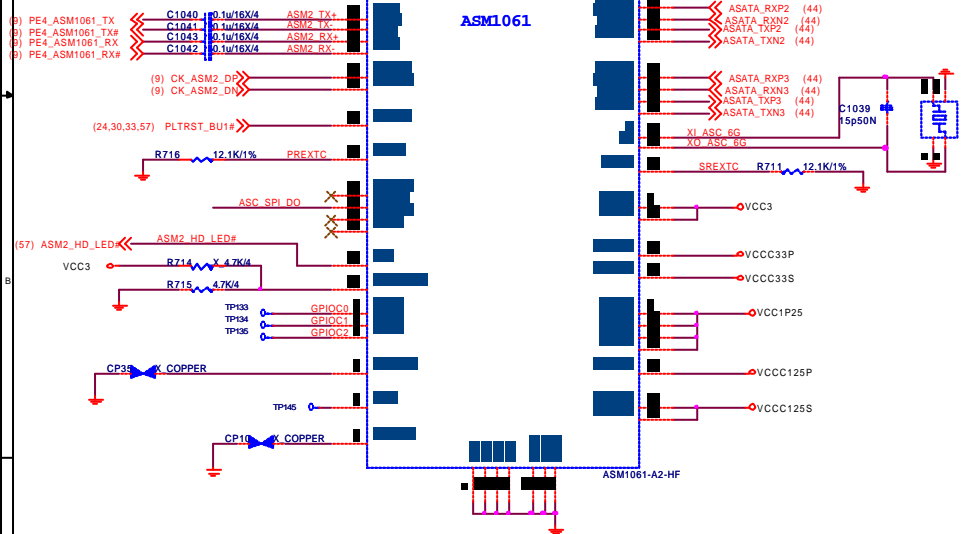
# ASM1061-A



# ASM1061-B

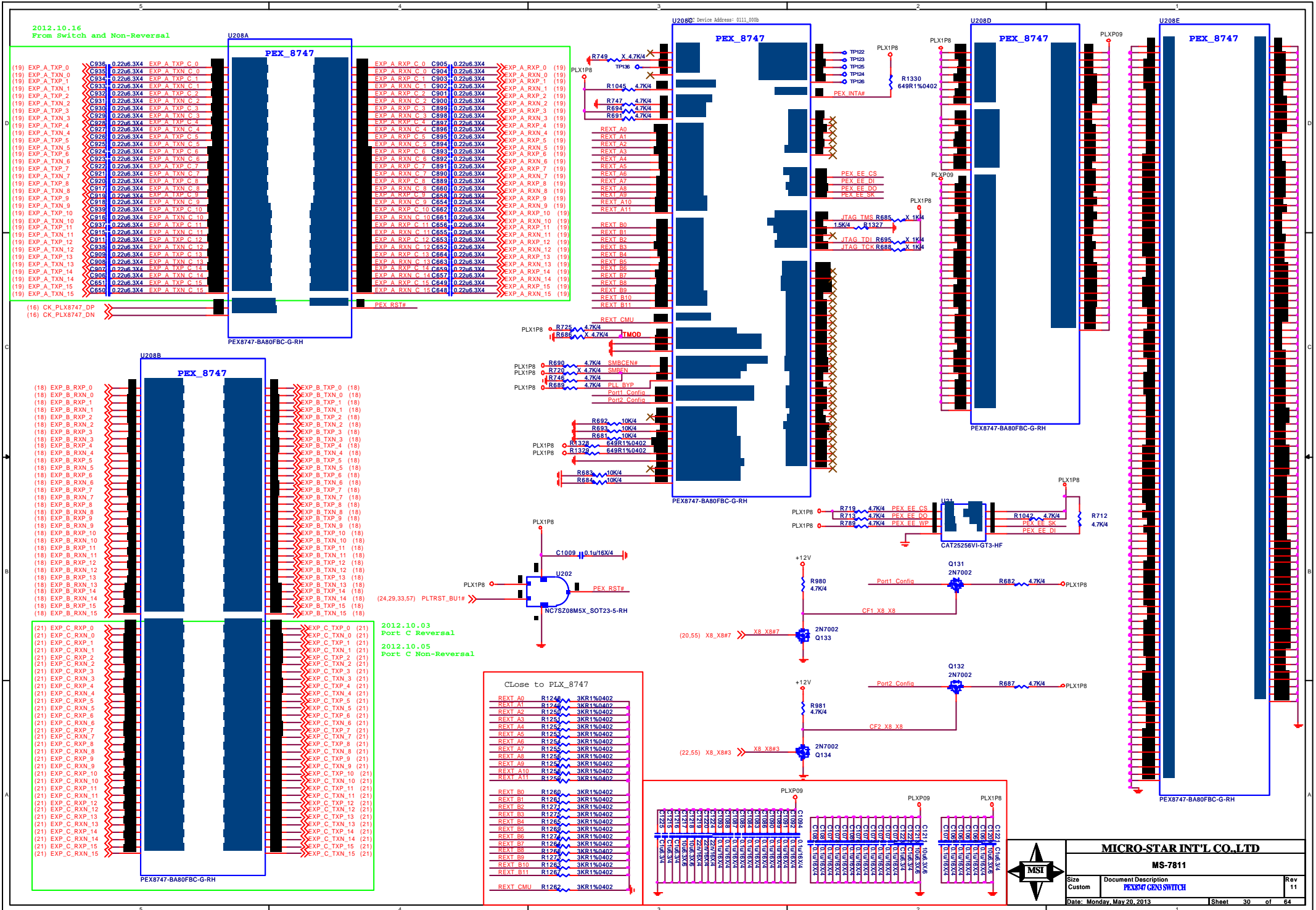


# ASM1061-C



MICRO-STAR INT'L CO.,LTD		
MS-7811		
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2012.10.16  
From Switch and Non-Reversal



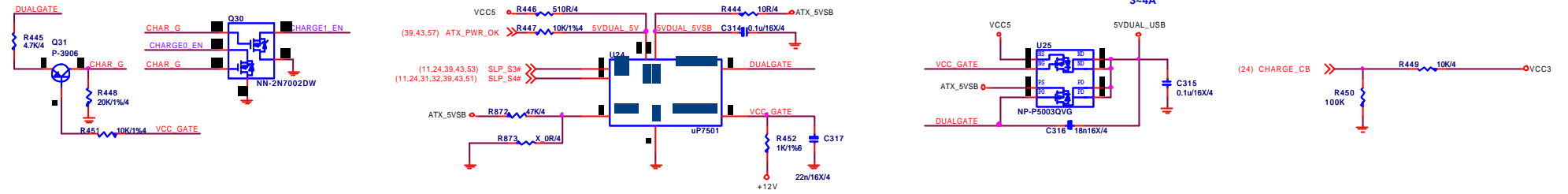




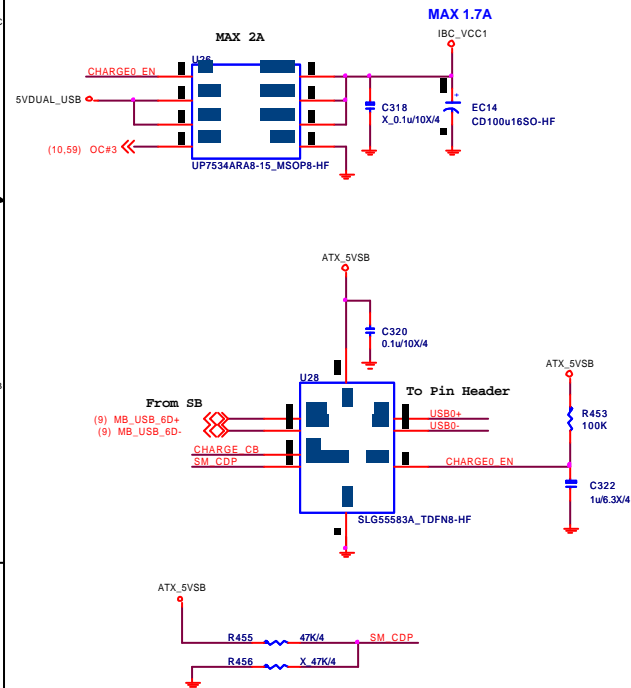




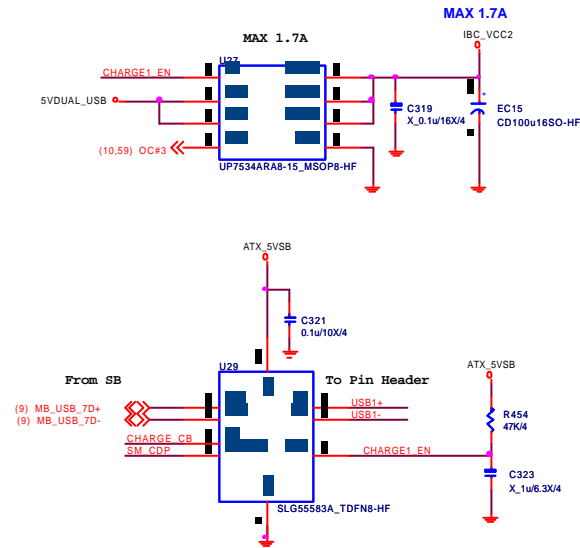
# 5VDUAL\_USB - uP7501



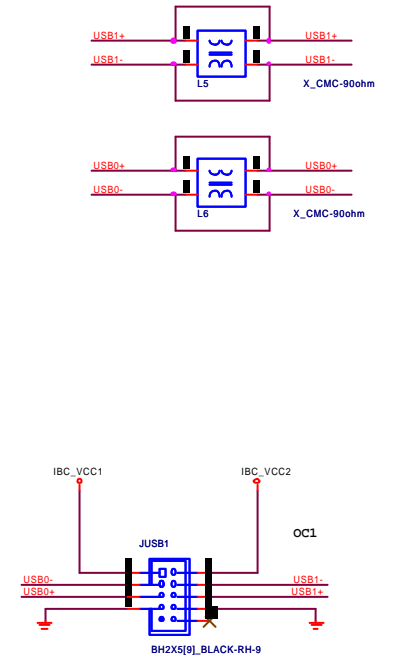
## USB POWER PORT 0 For USB Charging



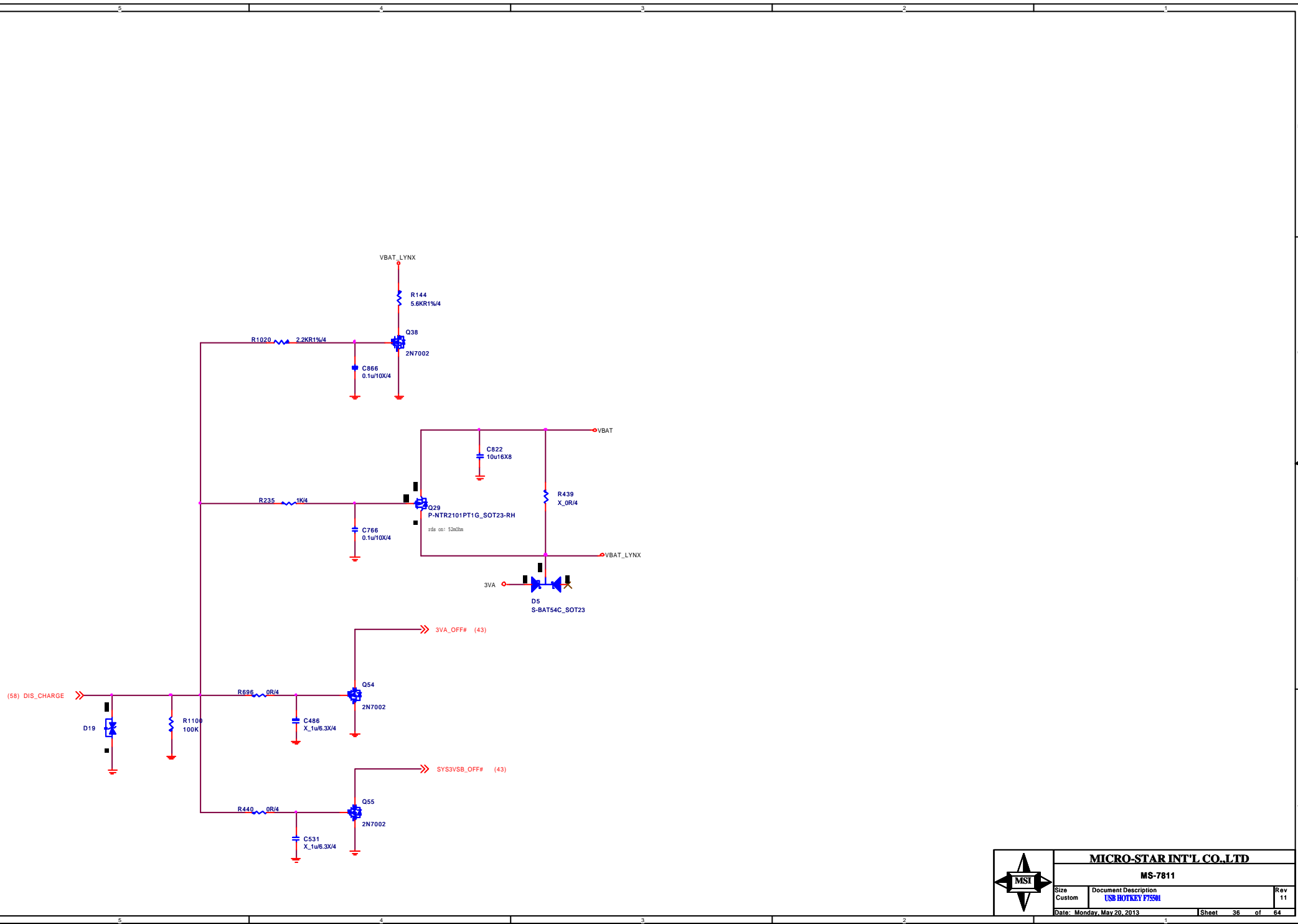
## USB POWER PORT 1 For USB Charging

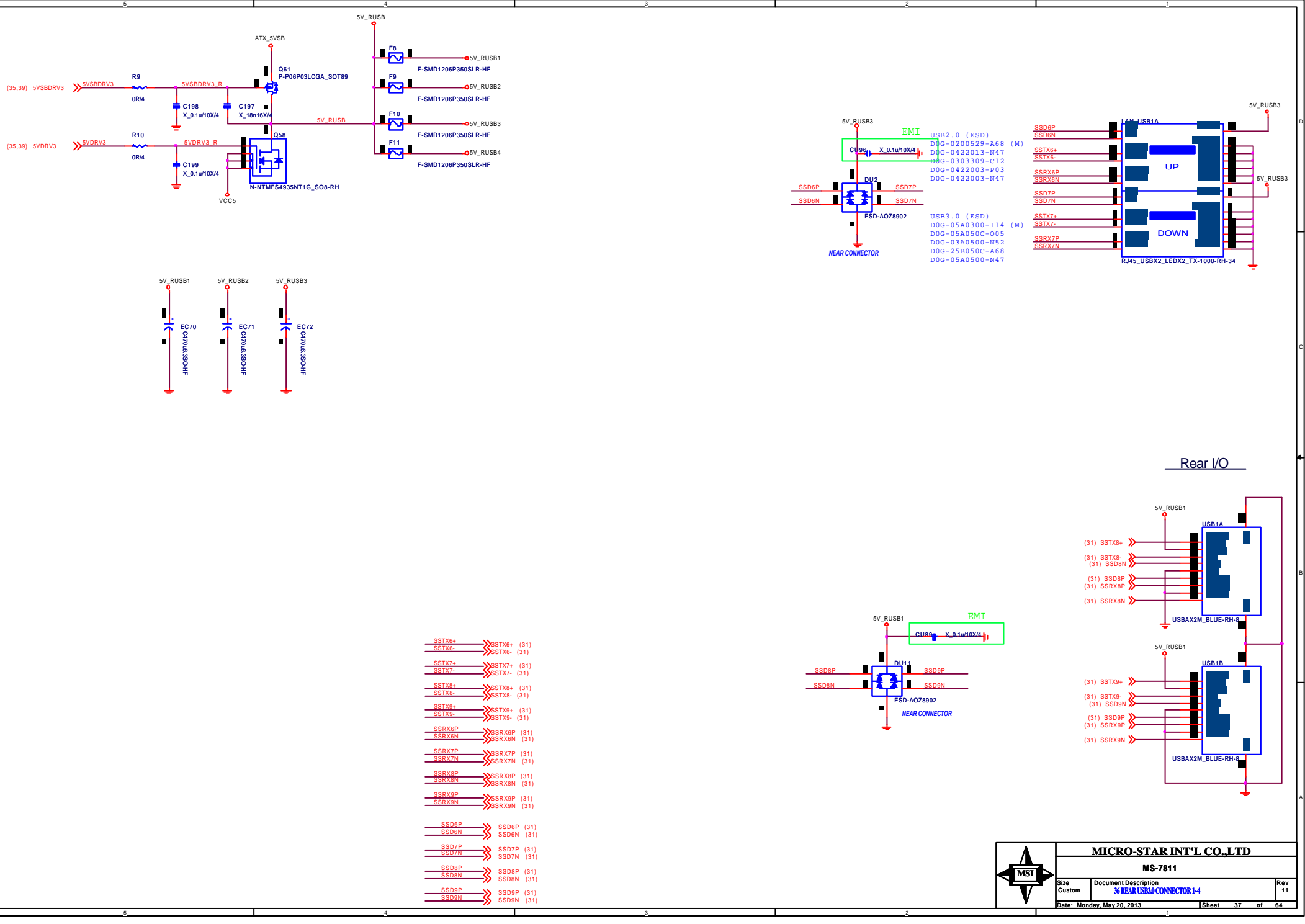


## FRONT USB PORT 0,1

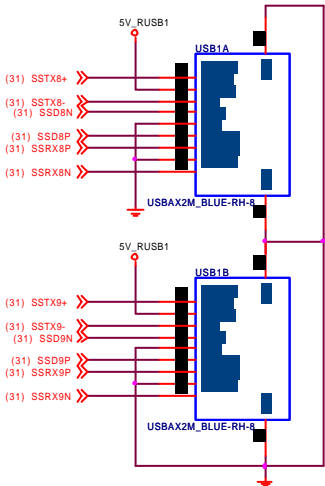






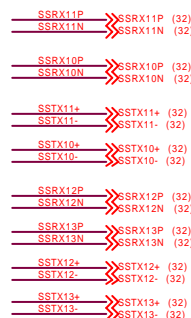
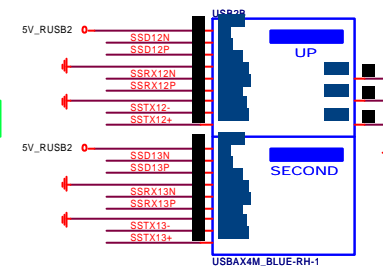
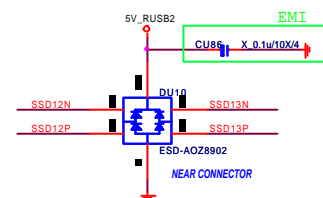
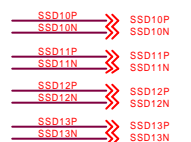
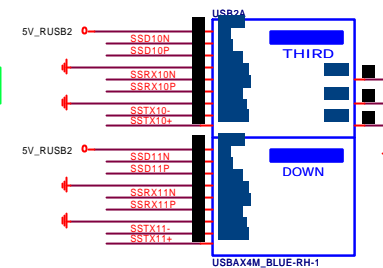
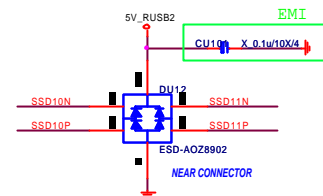


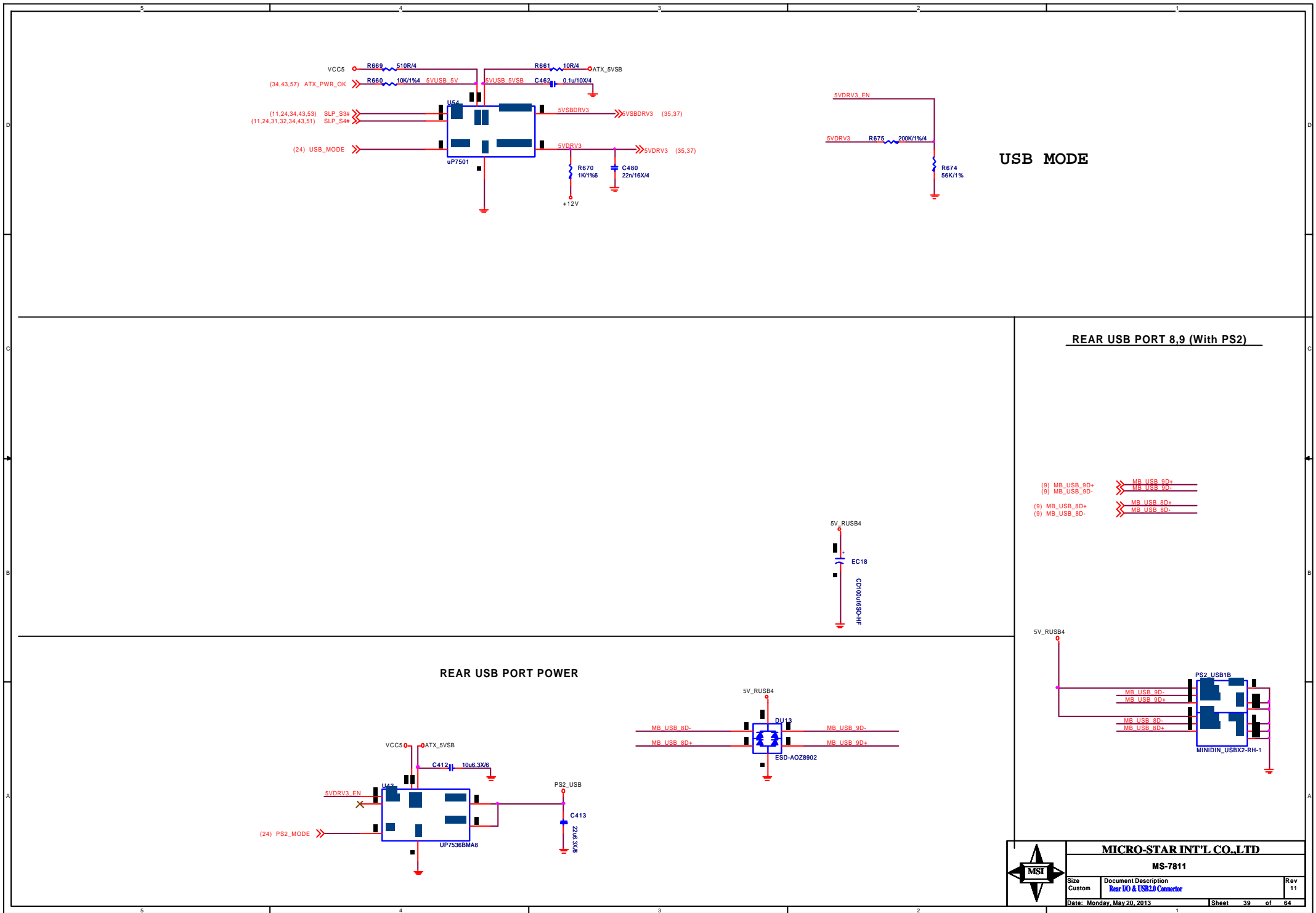
Rear I/O



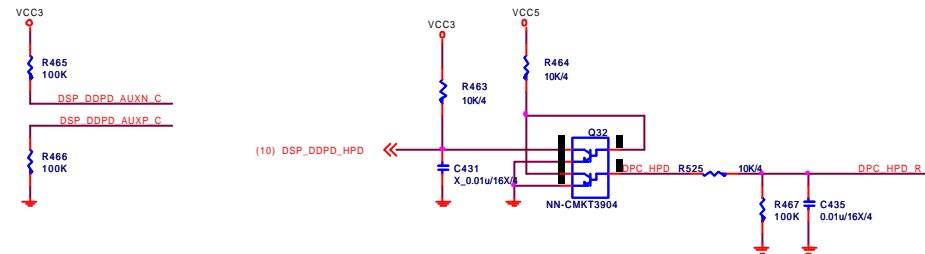
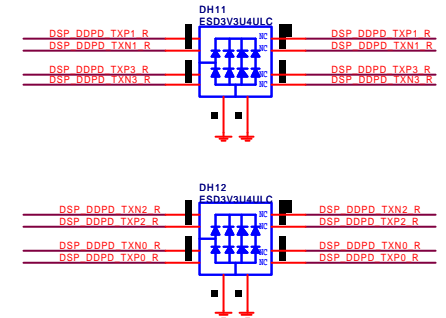
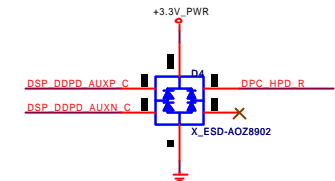
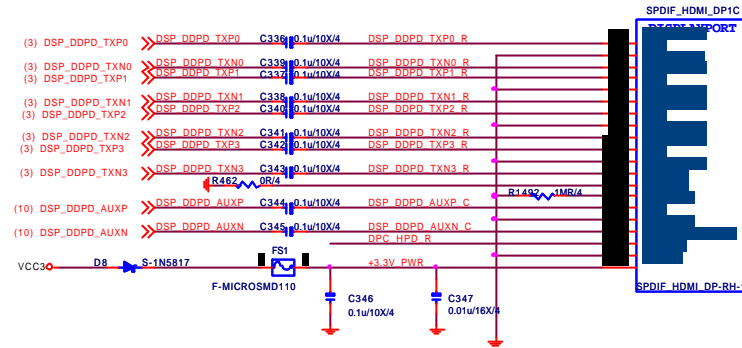
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# Rear I/O



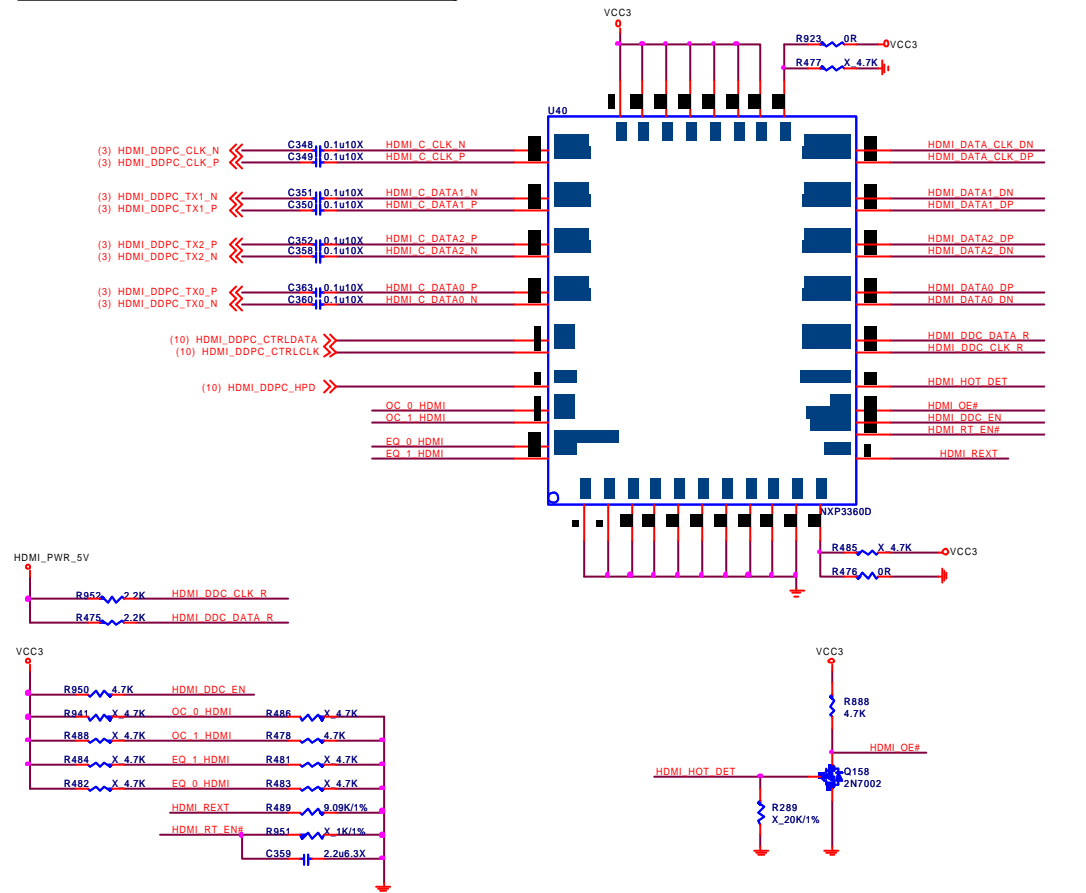


# DP





# HDMI level shifter



	"0"	"1"	note
DDC_EN	DDC level shifter disable	DDC level shifter enable	internal pull-up at ~500K ohm.
RT_EN#	Input 50 ohm termination resistor enable	the input termination ; resistors are set to high impedances	internal pull-down at ~500K ohm.
OE#	enable	the chip is power down and input termination resistors will be at high impedance.	internal pull-down at ~500K ohm.
HPD_SINK	disable	enable	internal pull-down at ~200K ohm; 5V tolerant.
DDCBUF_EN	For DDC level shifting configuration, please refer to Table.		internal pull-down at ~500K ohm.
REXT			analog current generation.

[DDC_EN, DDCBUF_EN, OE#]	DDC Passive Switch	DDC Active Buffer
1, 0, X	On	Off
1, 1, 0	Off	On
1, 1, 1	Off	Off
0, X, X	Off	Off

PC1, PC0		note
00	8 dB	internal pull-down at ~500K ohm.
01	4 dB	
10	12 dB	
11	0 dB	

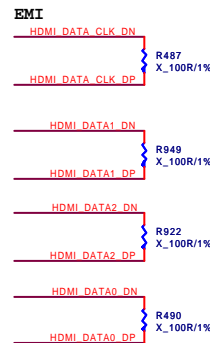
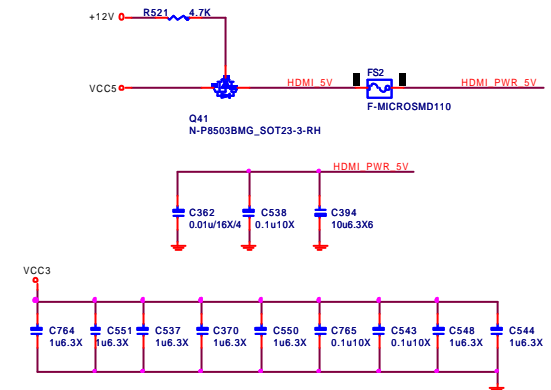
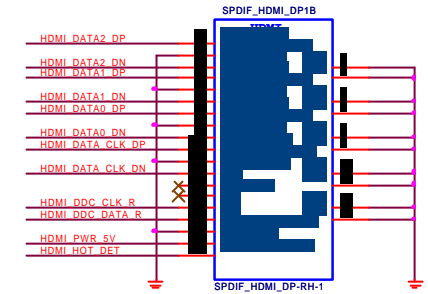
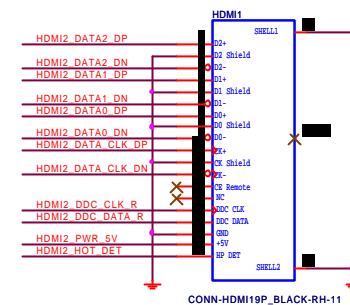


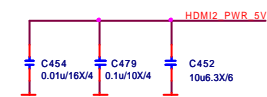
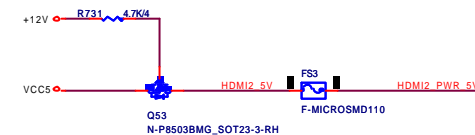
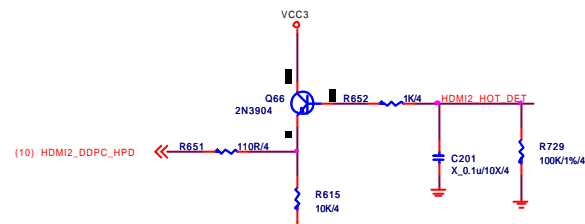
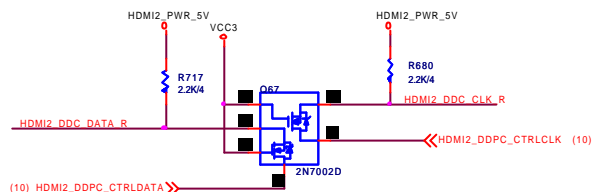
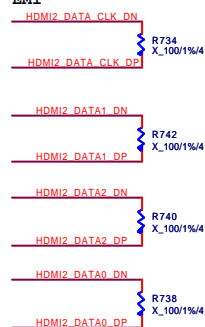
Table 8-1. PCH PCI Express Tx/RX - HDMI Signal Mappings

Port	Digital Display Interface Differential Pairs	HDMI Signals	PCH Digital Display Interface Pins
Port B	DDSP_B_TX0_DN	TMDSB_DATA2#	DDPB_CN
	DDSP_B_TX0_DP	TMDSB_DATA2	DDPB_OP
	DDSP_B_TX3_DN	TMDSB_DATA1#	DDPB_1N
	DDSP_B_TX3_DP	TMDSB_DATA1	DDPB_1P
	DDSP_B_TX2_DN	TMDSB_DATA0#	DDPB_2N
	DDSP_B_TX2_DP	TMDSB_DATA0	DDPB_2P
	DDSP_B_TX3_DN	TMDSB_CLK#	DDPB_3N
	DDSP_B_TX3_DP	TMDSB_CLK	DDPB_3P
	DDPB_HPD	DDSP_B_HPD0	Hot plug detect used by HDMI Port B.
	SDVO_CTRLCLK	HDMI_B_CTRL_CLK	HDMI DDC lines for Port B
	SDVO_CTRLDATA	HDMI_B_CTRL_DATA	

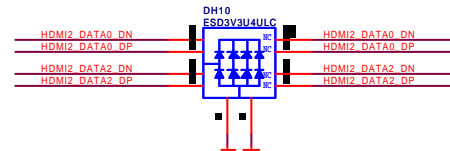
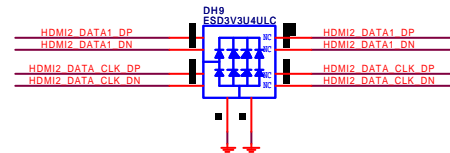
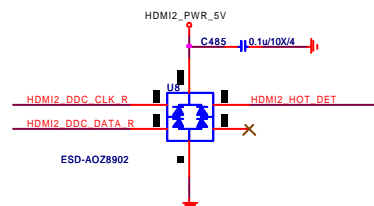
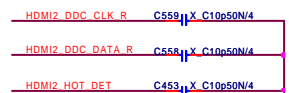




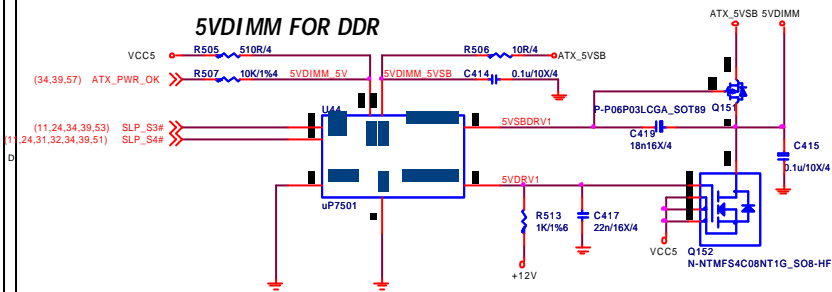
## EMI



## EMI cap.



## 5VDIMM FOR DDR



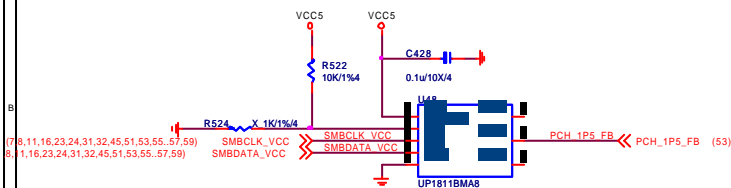
7501 Mode  
H:Support S0/S3/S5  
L:Support S0/S3

5VDRV1看VCC5起來6-10ms後起來,因為當初挑power

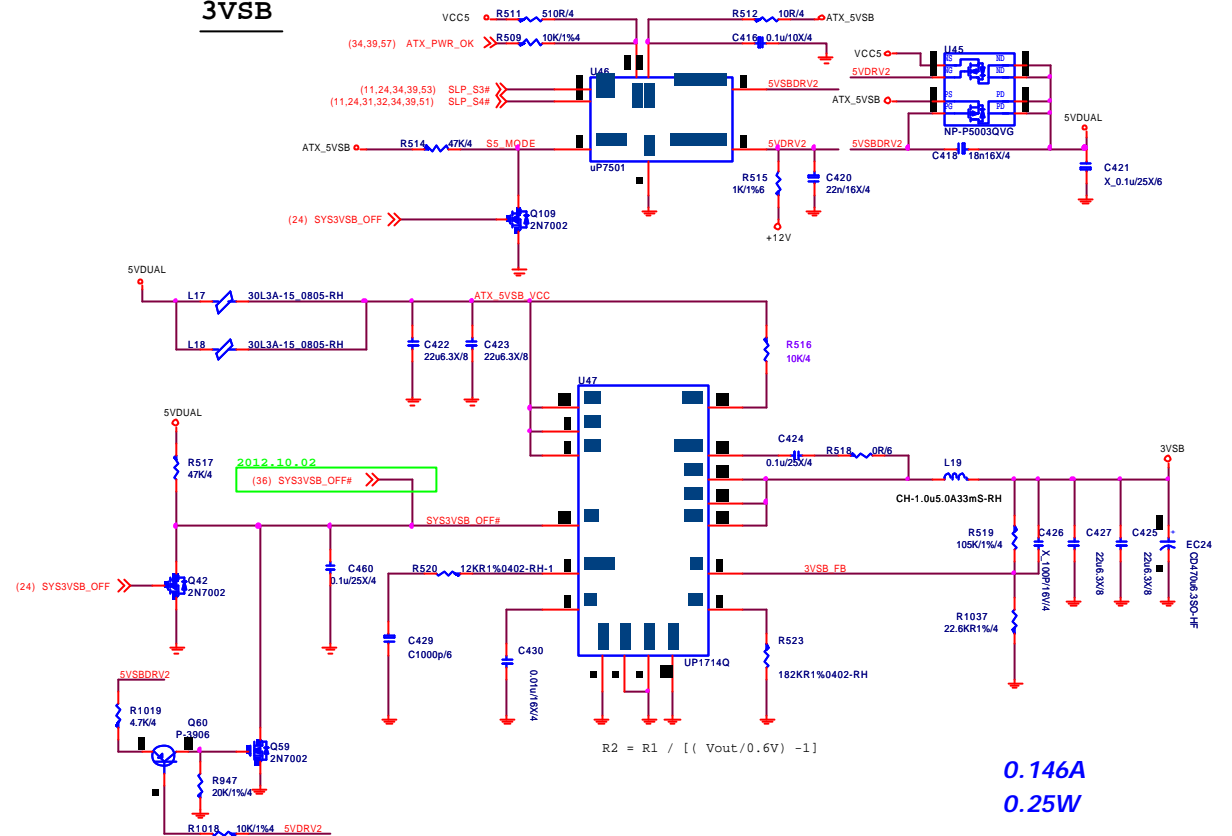
## UPI VOLTAGE CONSOLE

0x20:RH=10K,RL=OPEN

ADDRESS	0x2A	0X28	0x26	0x24	0x22	0x20
RH (KOhm)	OPEN	3.9	3	2.2	1.3	10
RL (KOhm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%



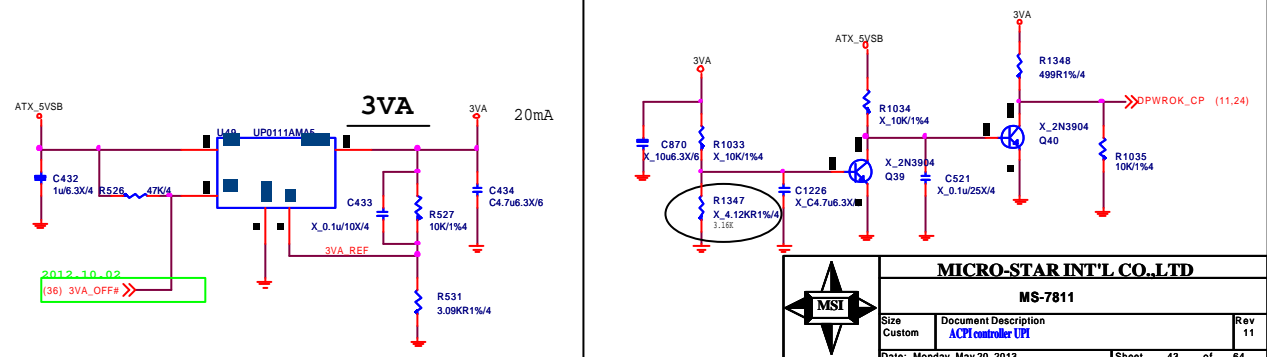
## 3VSB



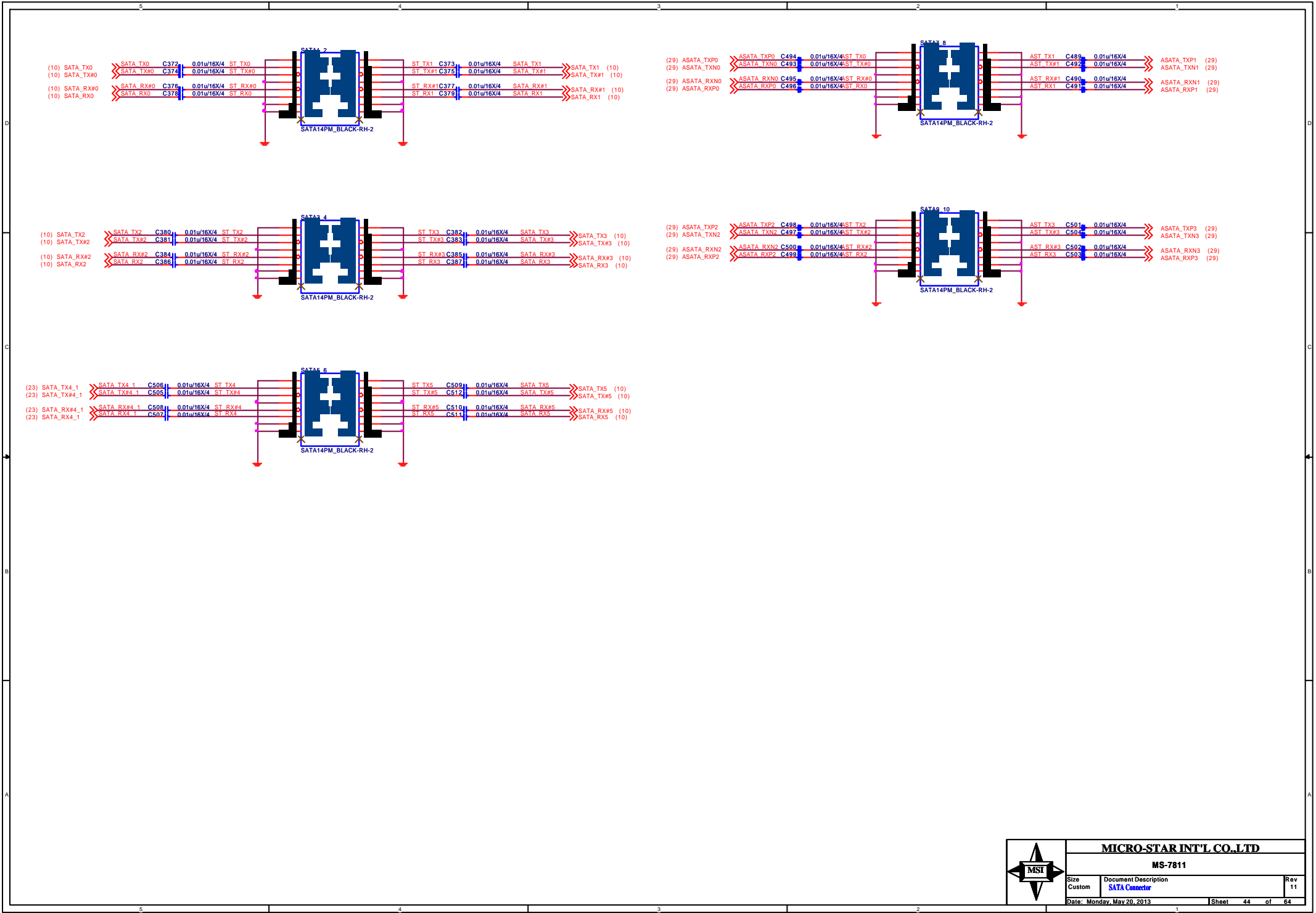
$$R2 = R1 / [(Vout/0.6V) - 1]$$

0.146A  
0.25W

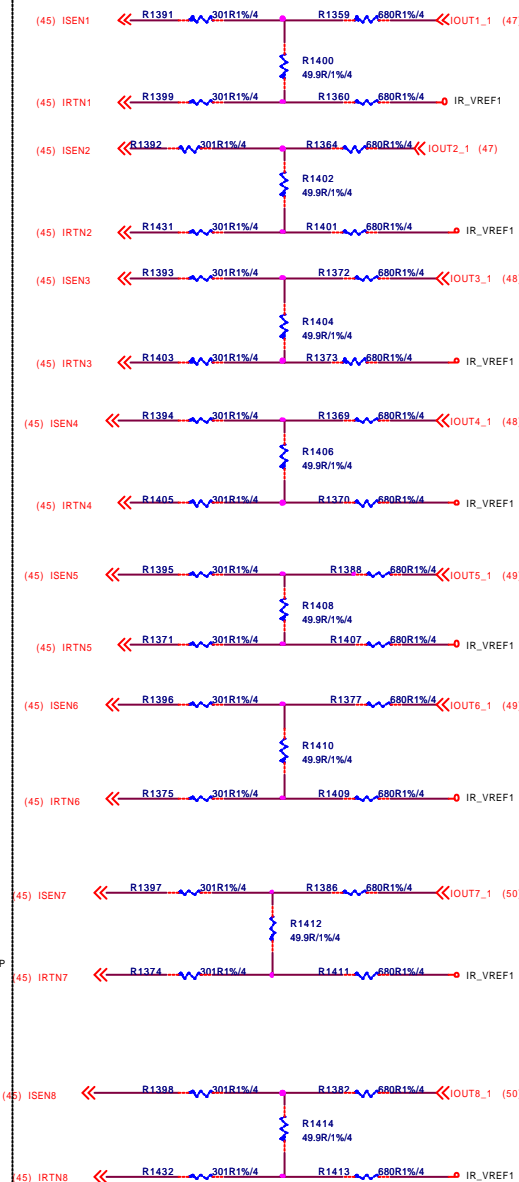
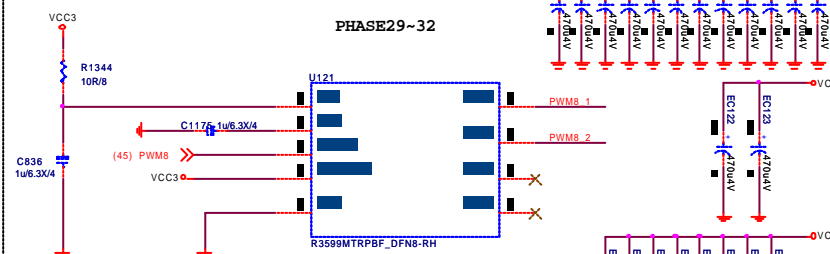
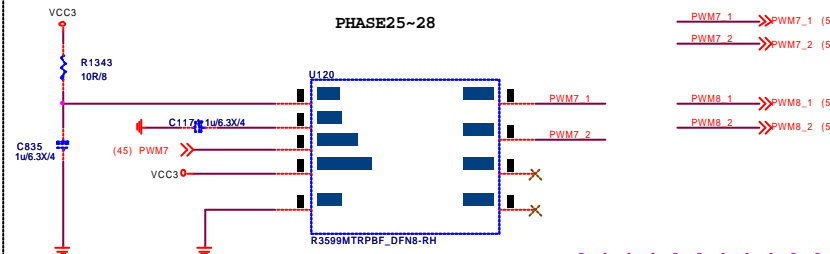
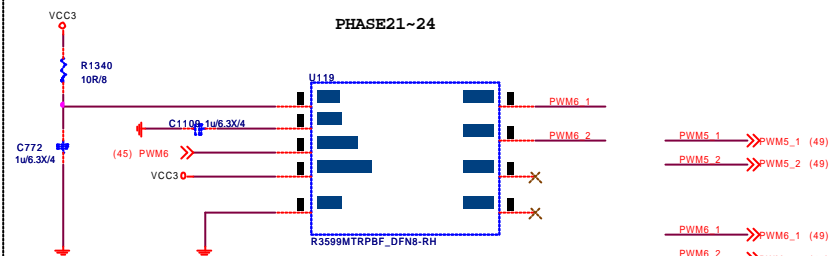
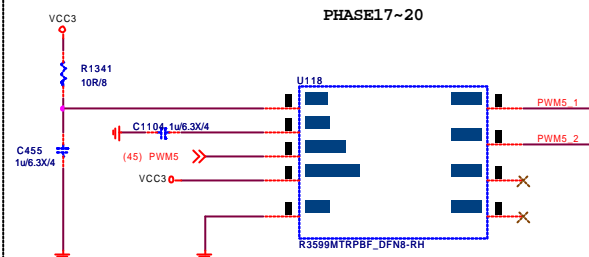
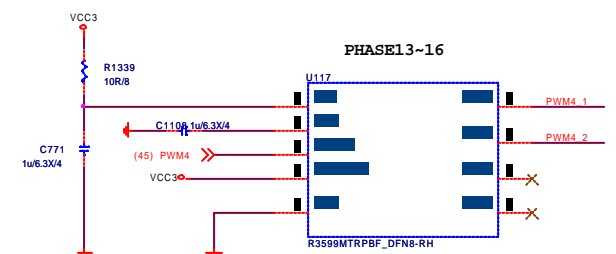
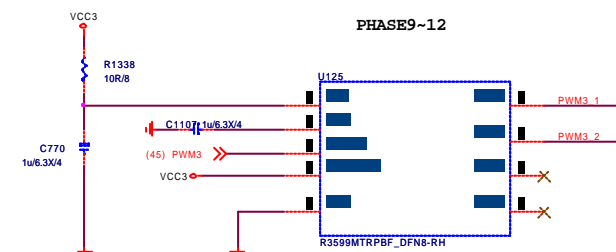
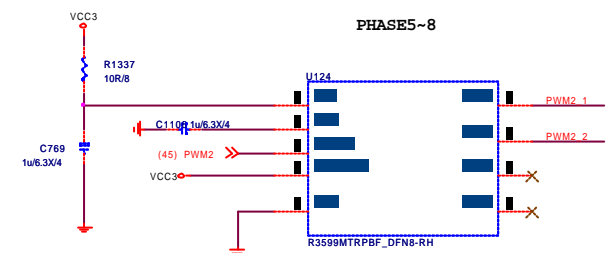
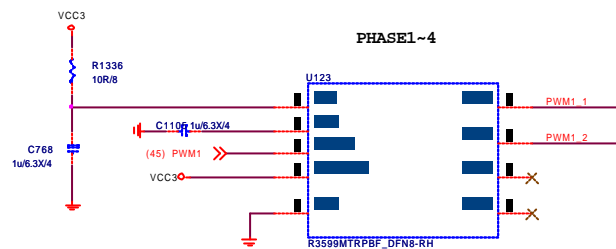
## Deep Power OK



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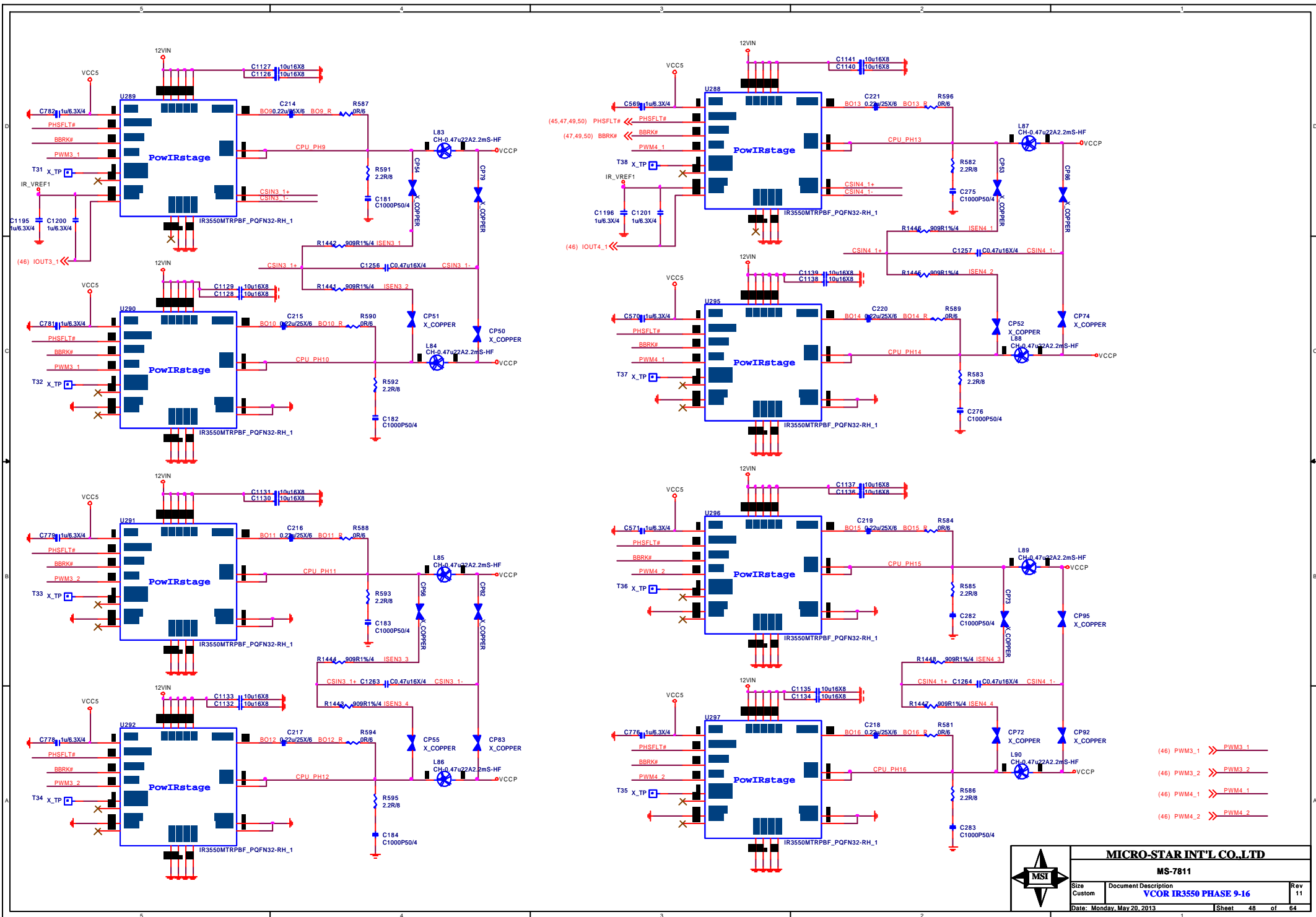




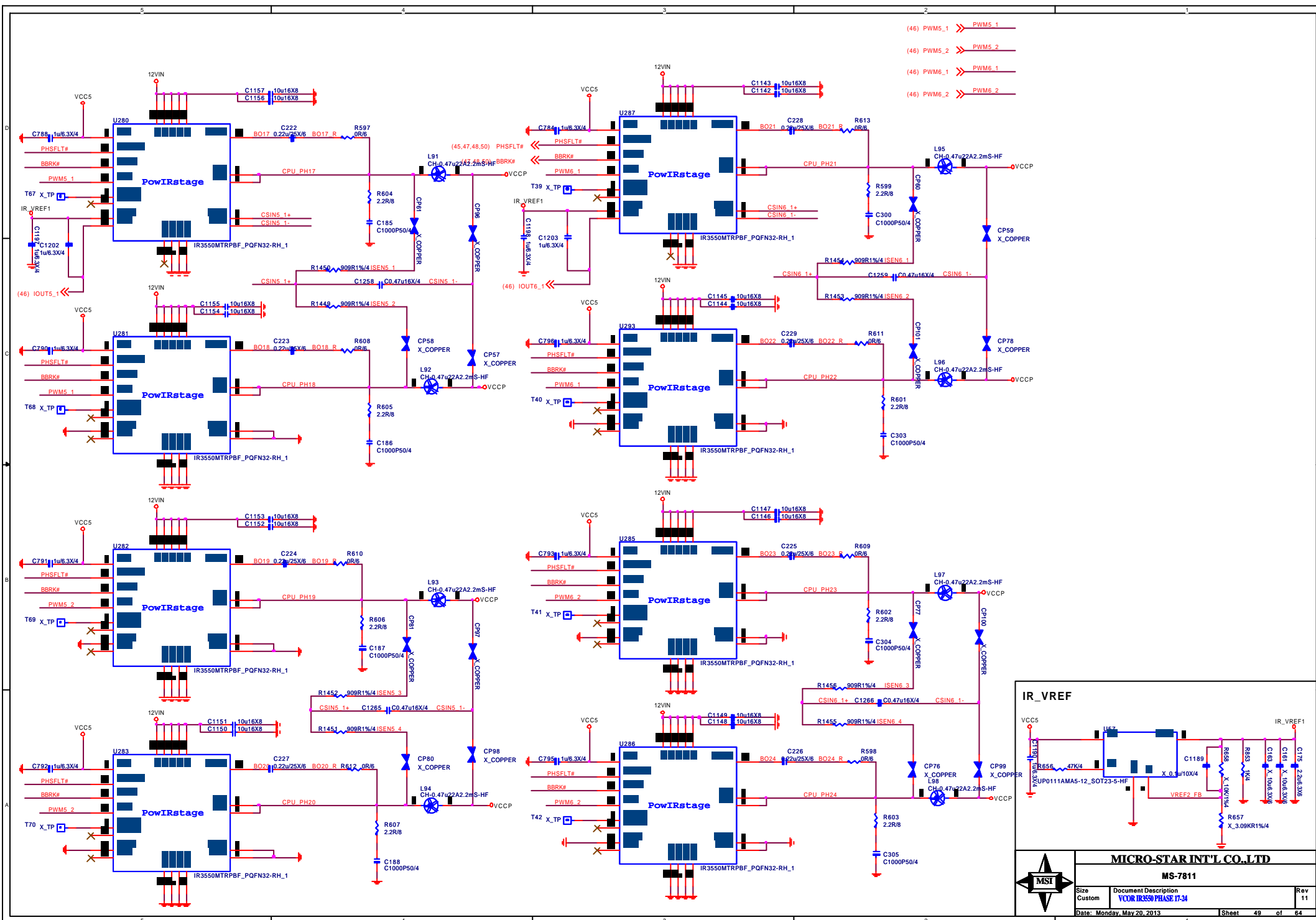


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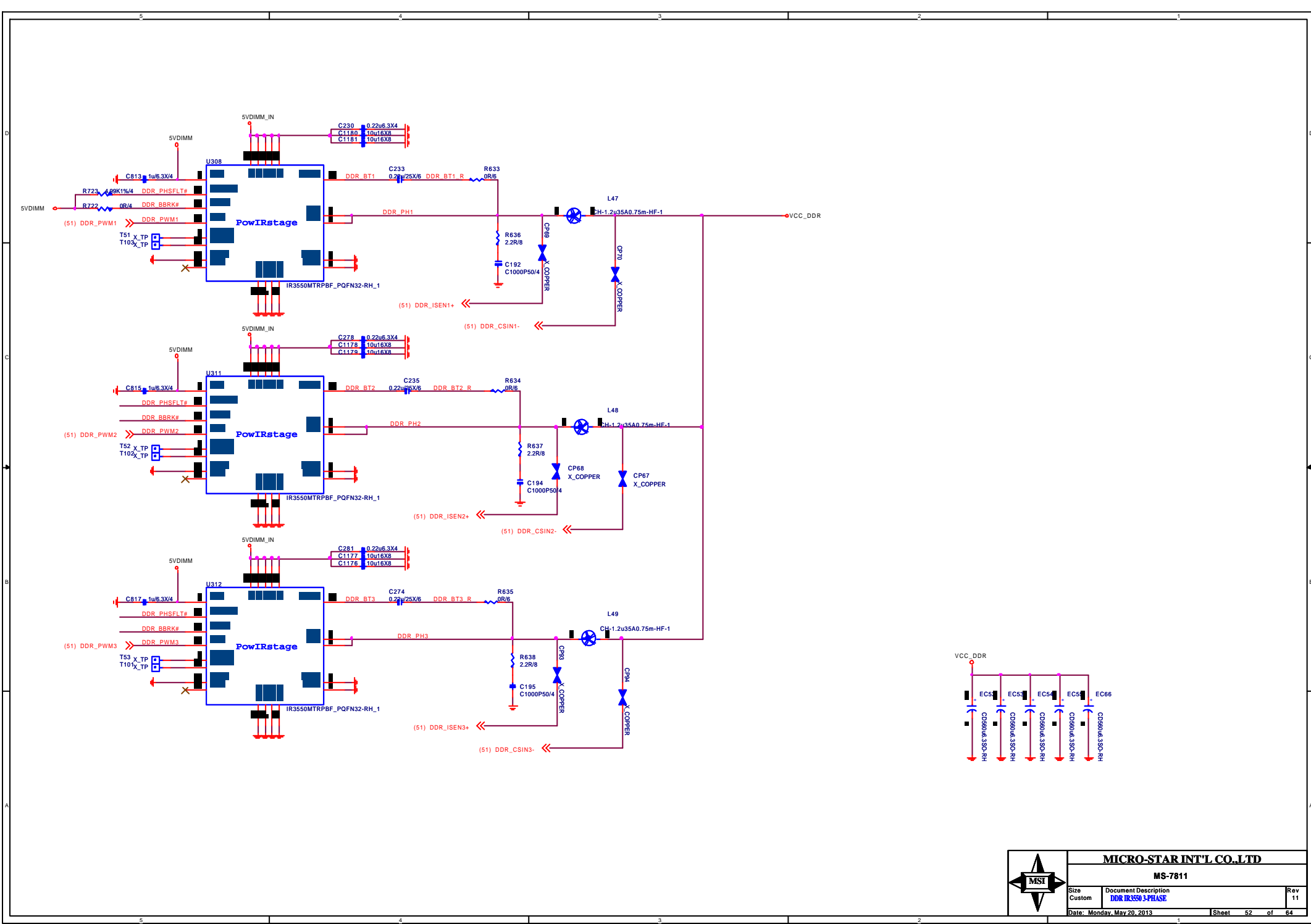










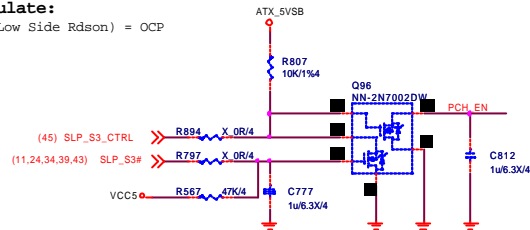


## PCH Power:1.05V

PCH Core 7.621A

OCF calculate:

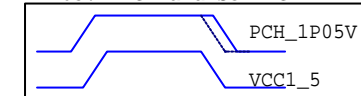
$375\text{mV} / (\text{Low Side } R_{\text{dson}}) = \text{OCF}$



VCC1\_5\_CTRL\_INPUT:

0:1P05V low or S3 low

1:1P05V HIGH and S3 HIGH

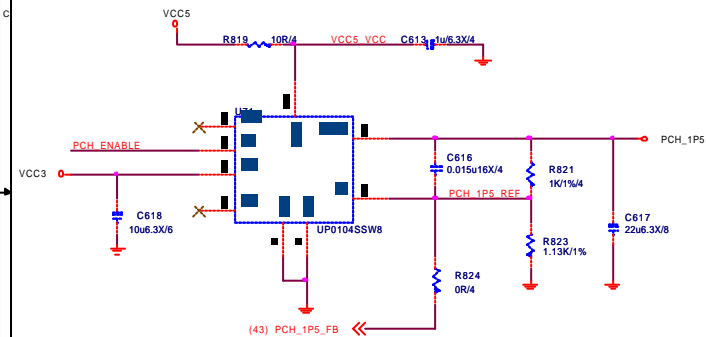


PCH\_1P5

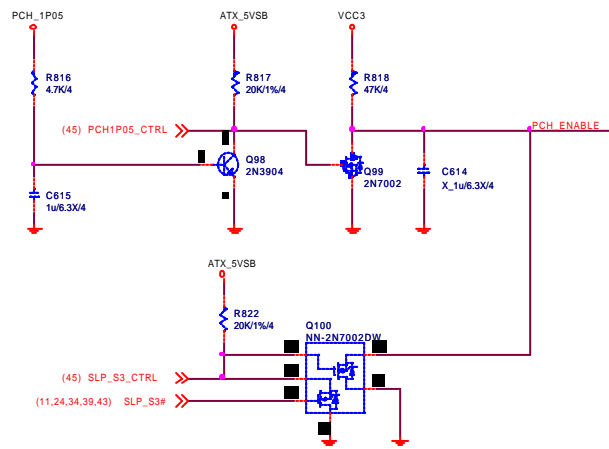
$I_{\text{max}}: 0.85\text{A}$

PCH: 0.35A

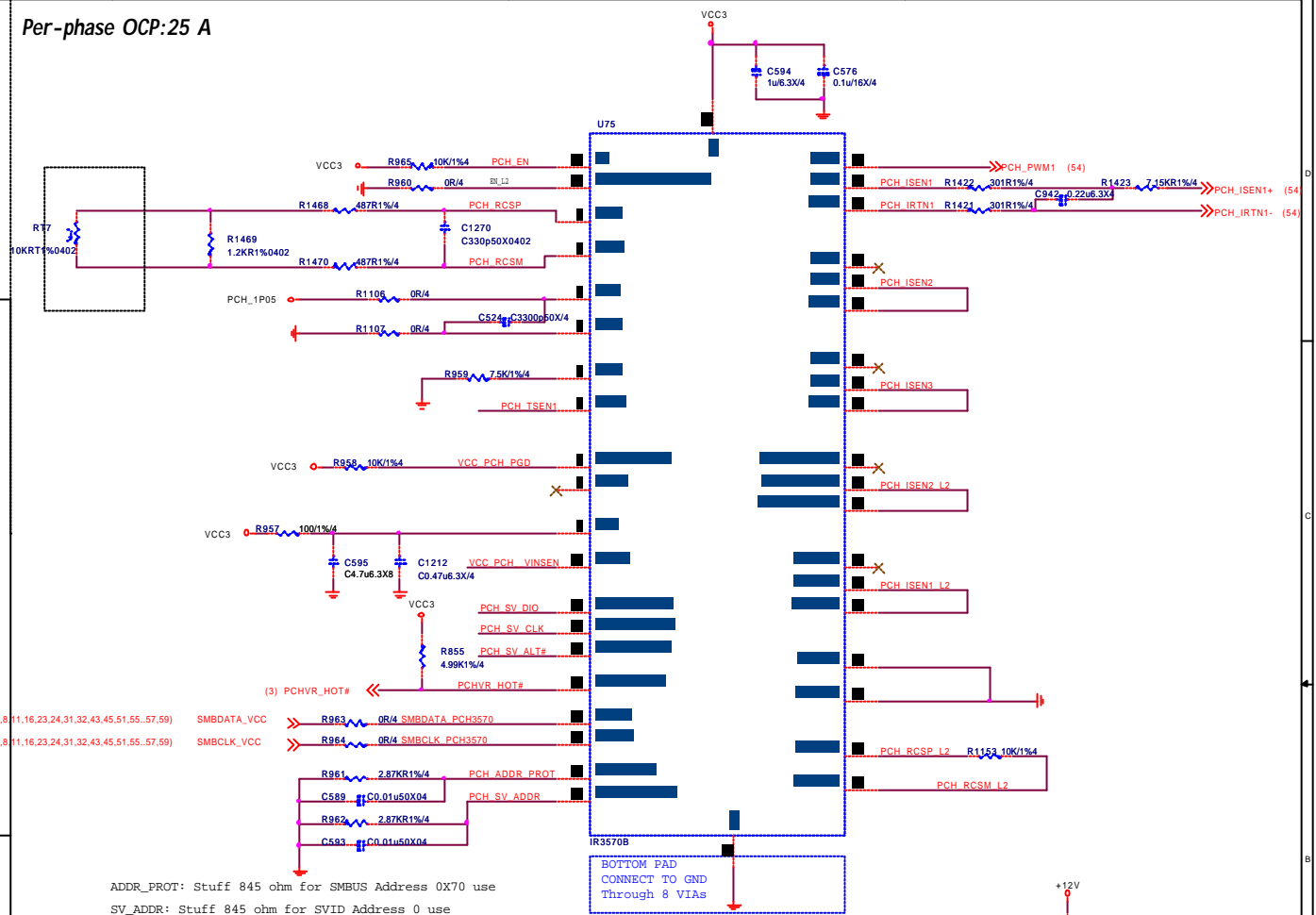
OV: -10mV



Waiting PCH\_1P05 Ready

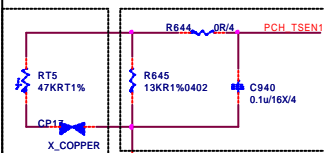


Per-phase OCP:25 A



ADDR\_PROT: Stuff 845 ohm for SMBUS Address 0X70 use

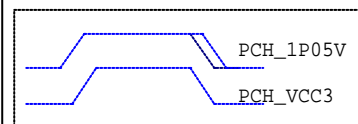
SV\_ADDR: Stuff 845 ohm for SVID Address 0 use



VCC1\_5\_CTRL\_INPUT:

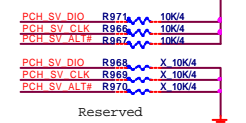
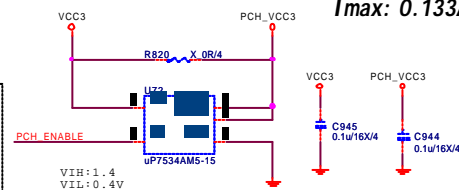
0:1P05V low or S3 low

1:1P05V HIGH and S3 HIGH



PCH\_VCC3

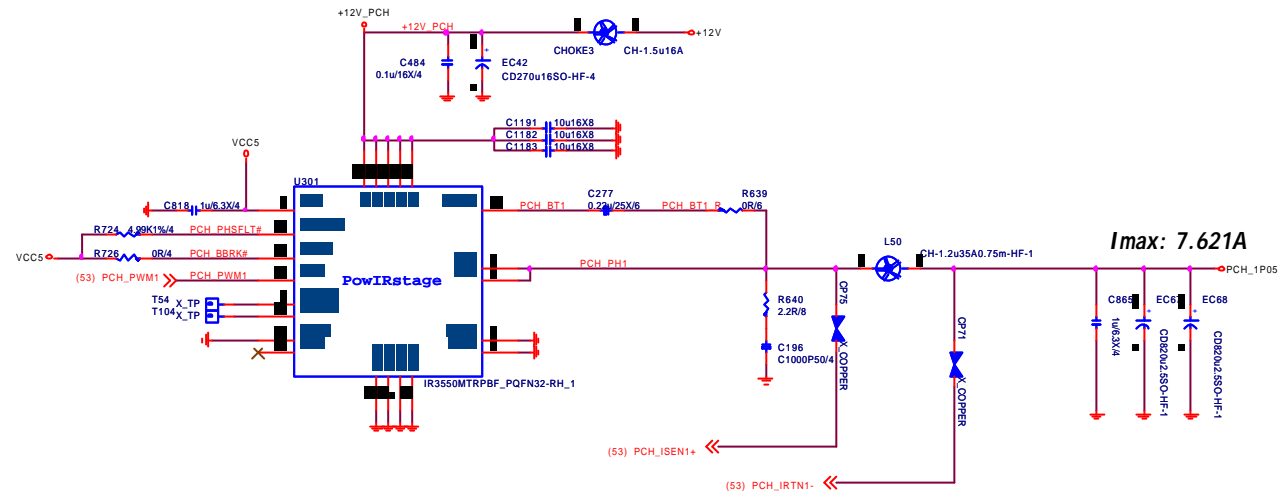
$I_{\text{max}}: 0.133\text{A}$



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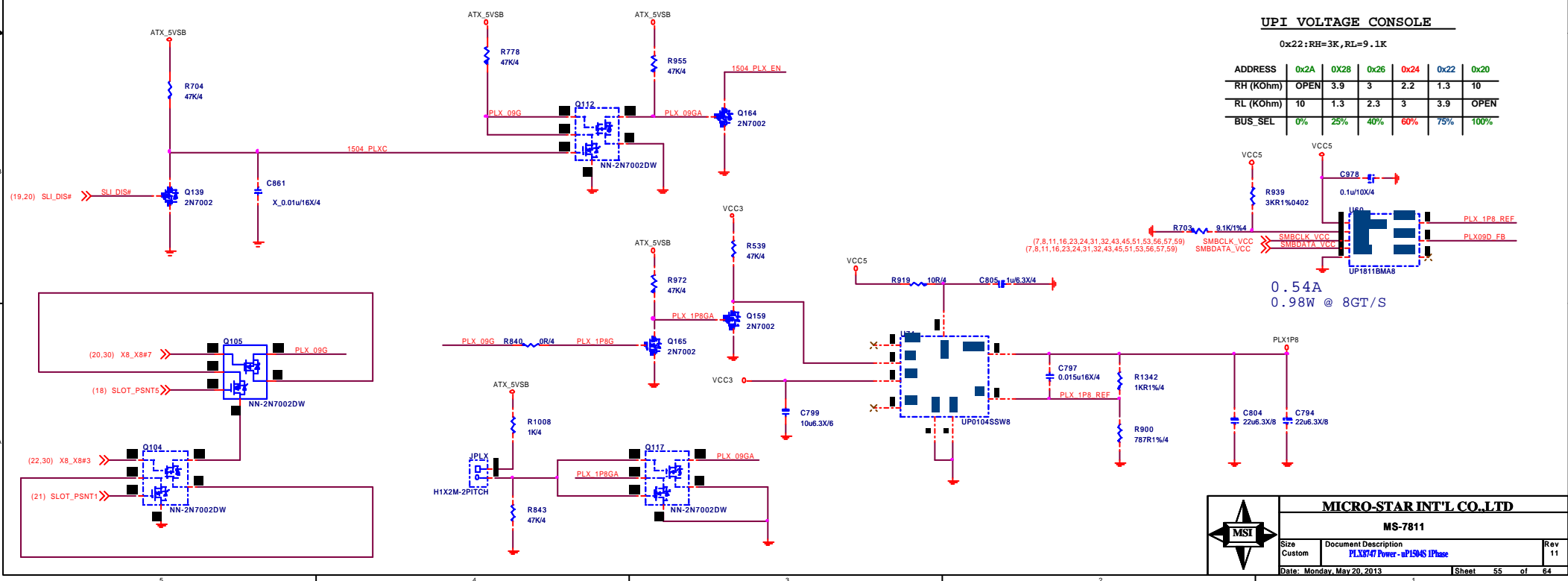
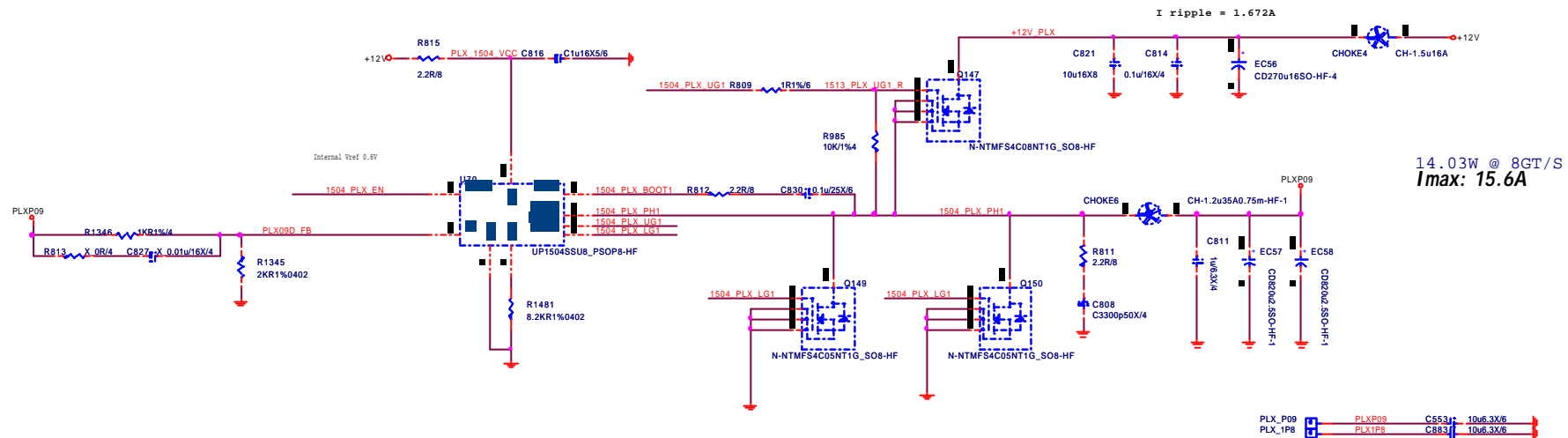
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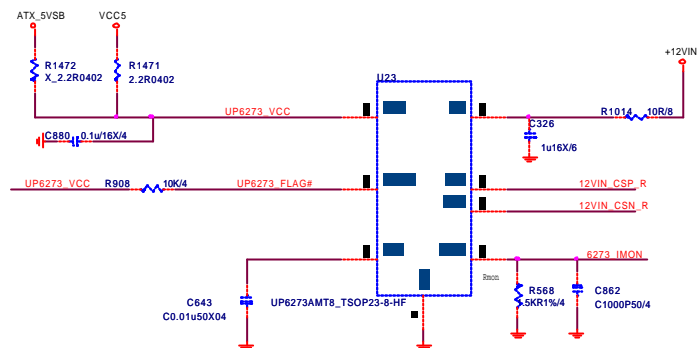
**MICRO-STAR INT'L CO.,LTD**

**MS-7811**

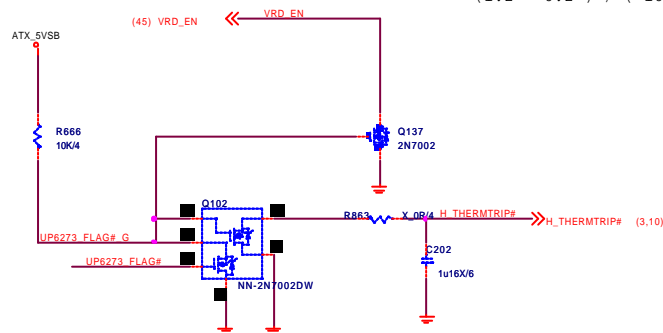
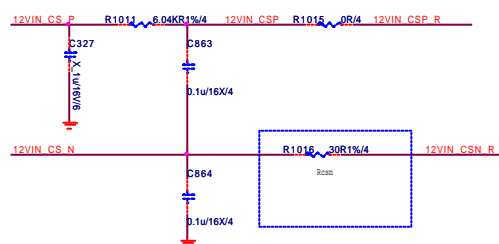
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$$(20\mu\text{A} * \text{Rocs}) / (4 * \text{Rds-on}) = \text{IOCP}$$
$$(20\mu\text{A} * 8.2\text{K}) / 4 * 1.7\text{mohm} = 24.11\text{A}$$


**POWER METER**  
**OCP: 120A**



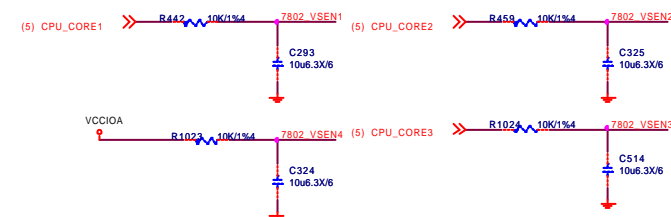
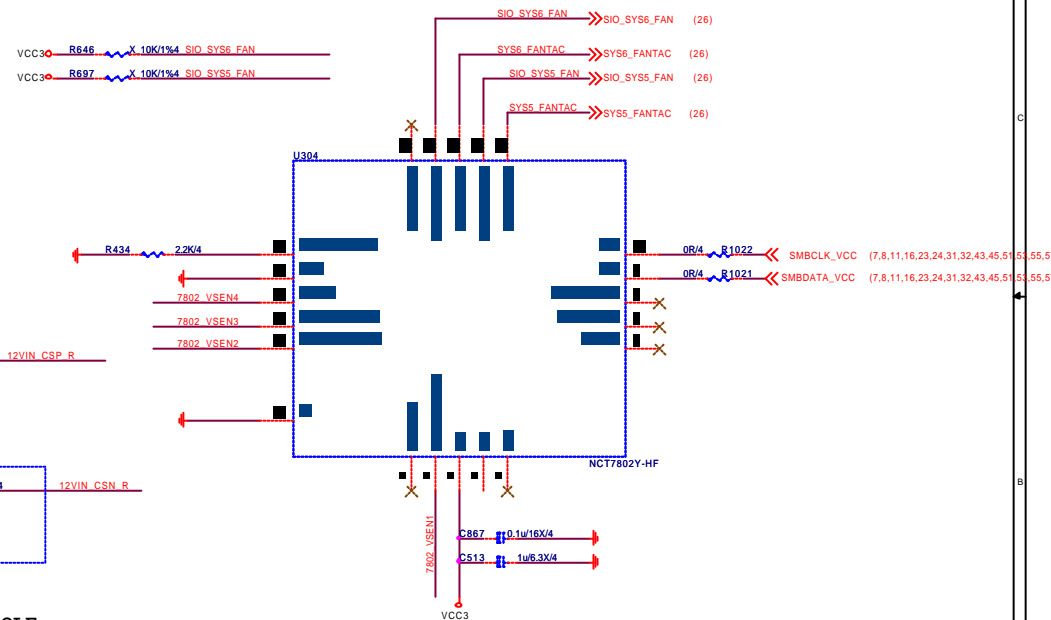
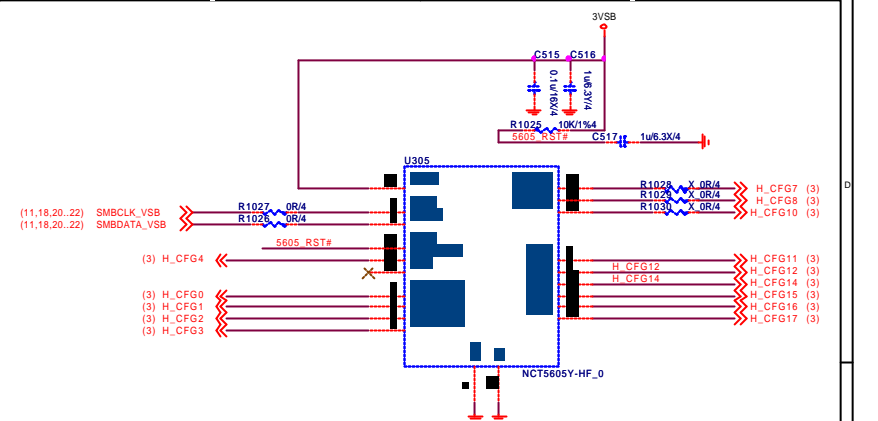
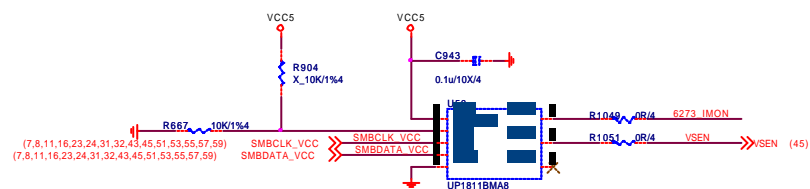
$I_{in} = (V_{mon} * R_{csn}) / (R_{mon} * R_{dc})$   
 $V_{mon} = 1.2$   
 can change OCP trigger level by Rcsn and Rmon  
 $(1.2 * 0.2) / (10K * 0.3m) = 80A$

[illegible]

## UPI VOLTAGE CONSOLE

0x2A: RH=OPEN, RL=10K

ADDRESS	0x2A	0x28	0x26	0x24	0x22	0x20
RH (KOhm)	OPEN	3.9	3	2.2	1.3	10
RL (KOhm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%



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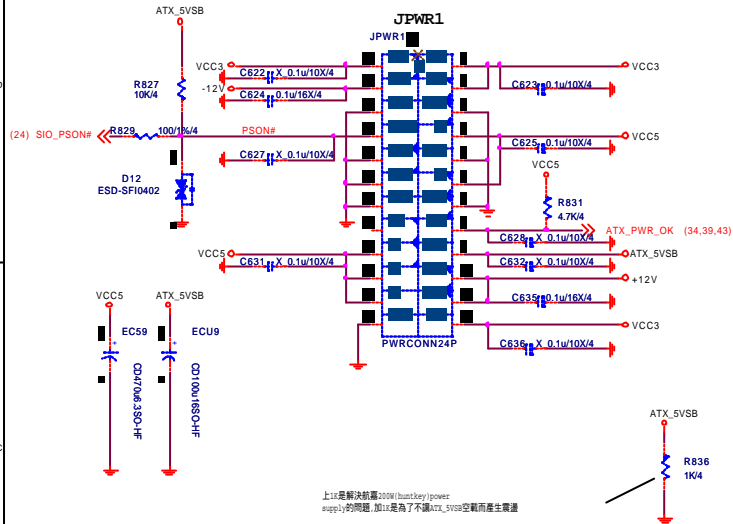
Size	Document Description
Custom	<b>CURRENT and VOLTAGE SENSE</b>

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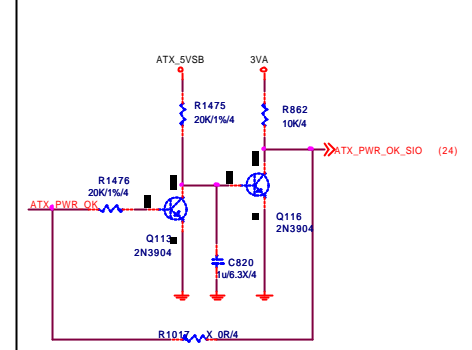
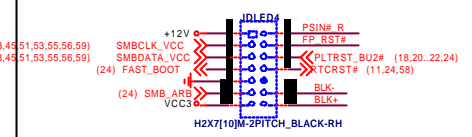
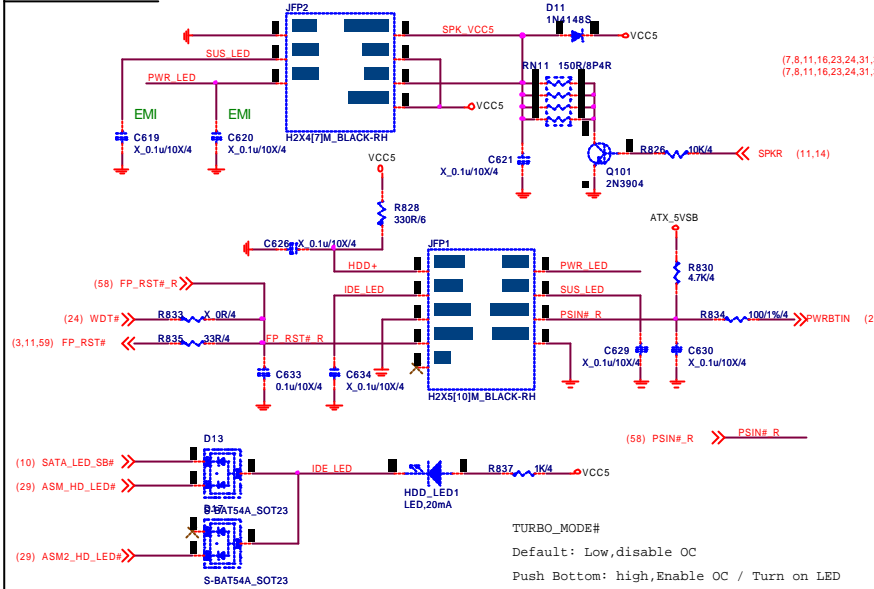
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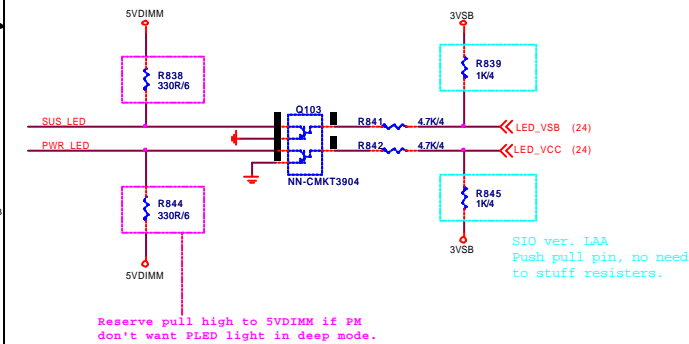
## ATX POWER CONNECTOR



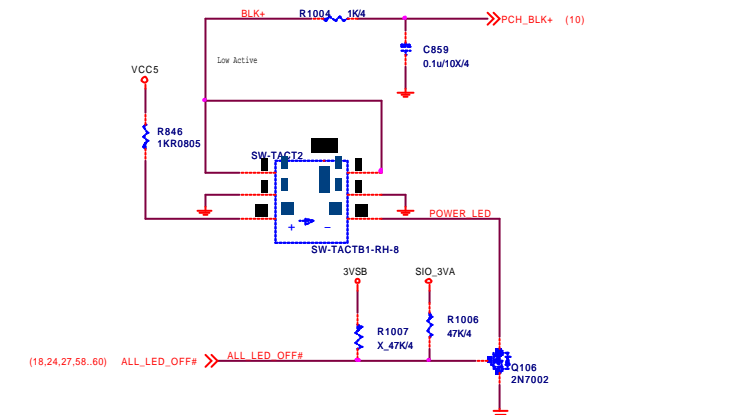
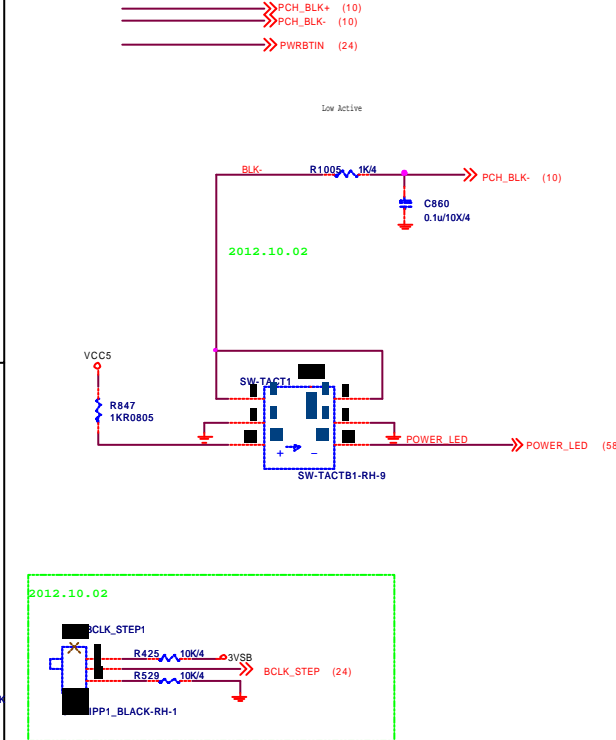
## FRONT PANNEL



## Front Panel LED

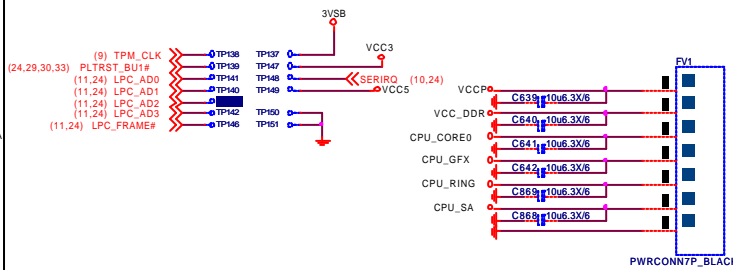


## Turbo Button



## TPM

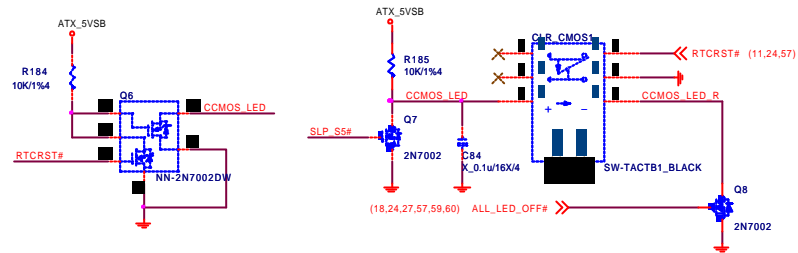
## Voltage test point



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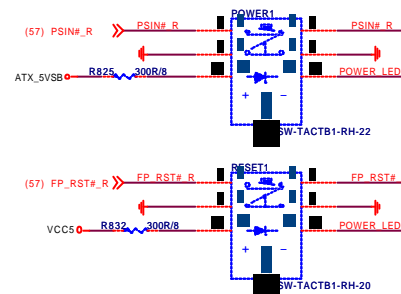
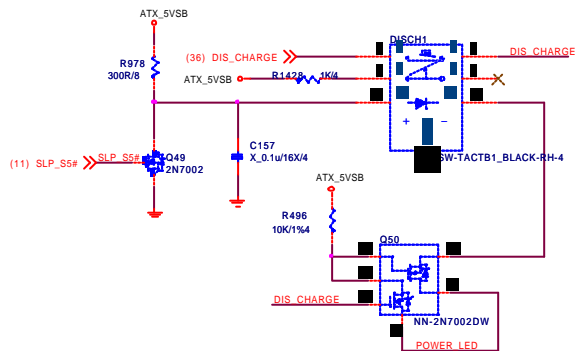
## LED LIGHTING RULE

S0/S3/S4	: LED OFF
S5	: LED ON

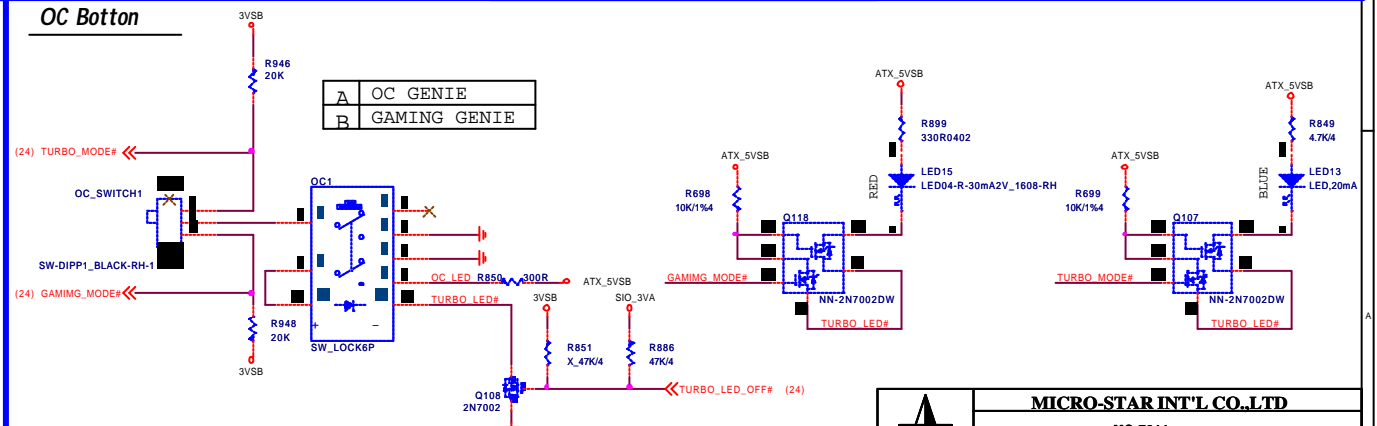
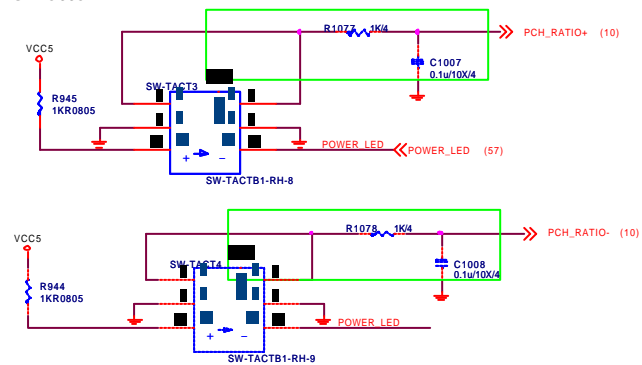


2012.10.15

**PWR/RST Botton**



**OC Botton**



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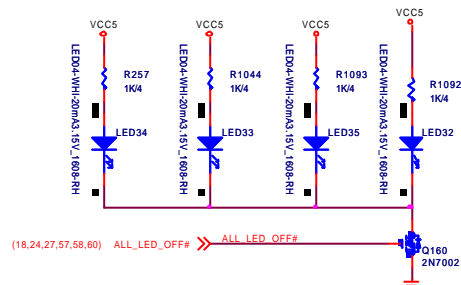
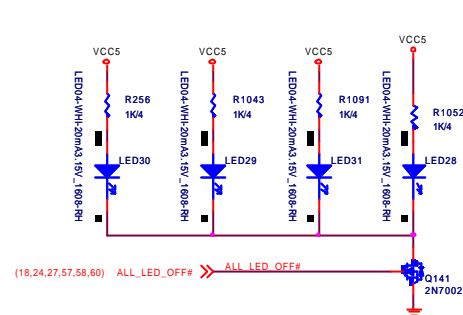
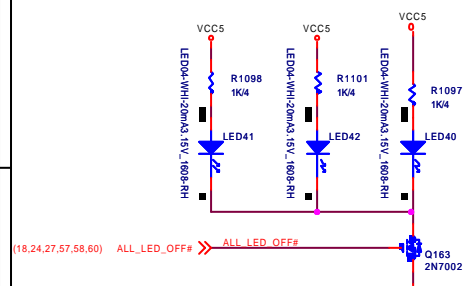
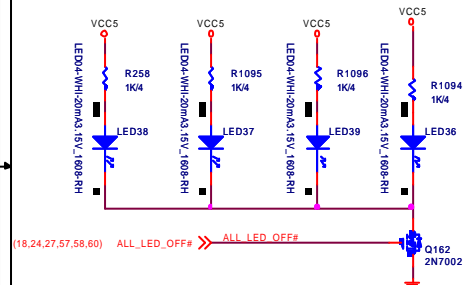
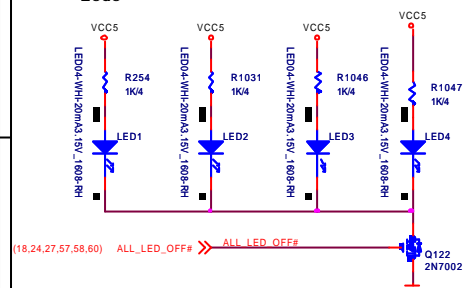
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Size Custom	Document Description <b>EMI CAP &amp; BOTTON</b>
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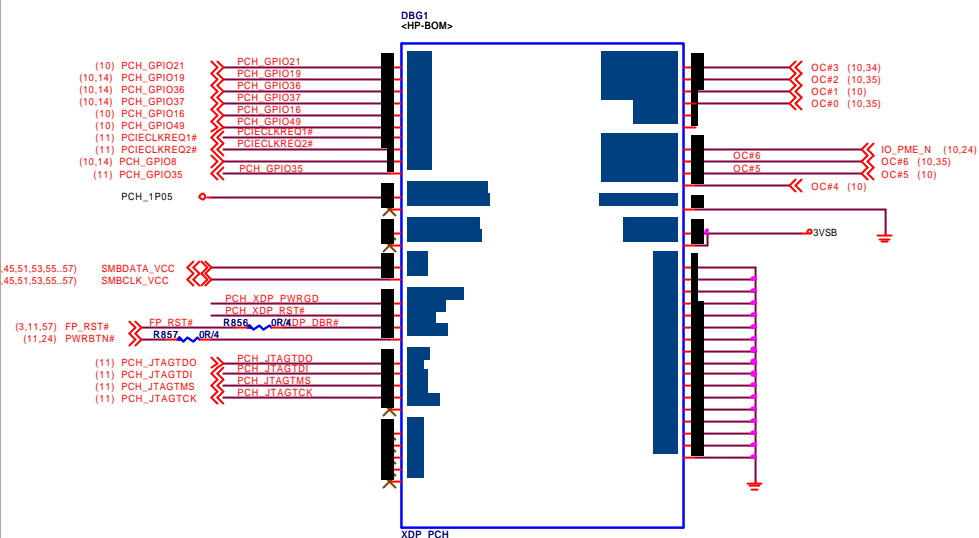
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**LOGO**



DBG1  
<HP-BOM>

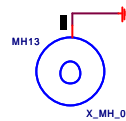
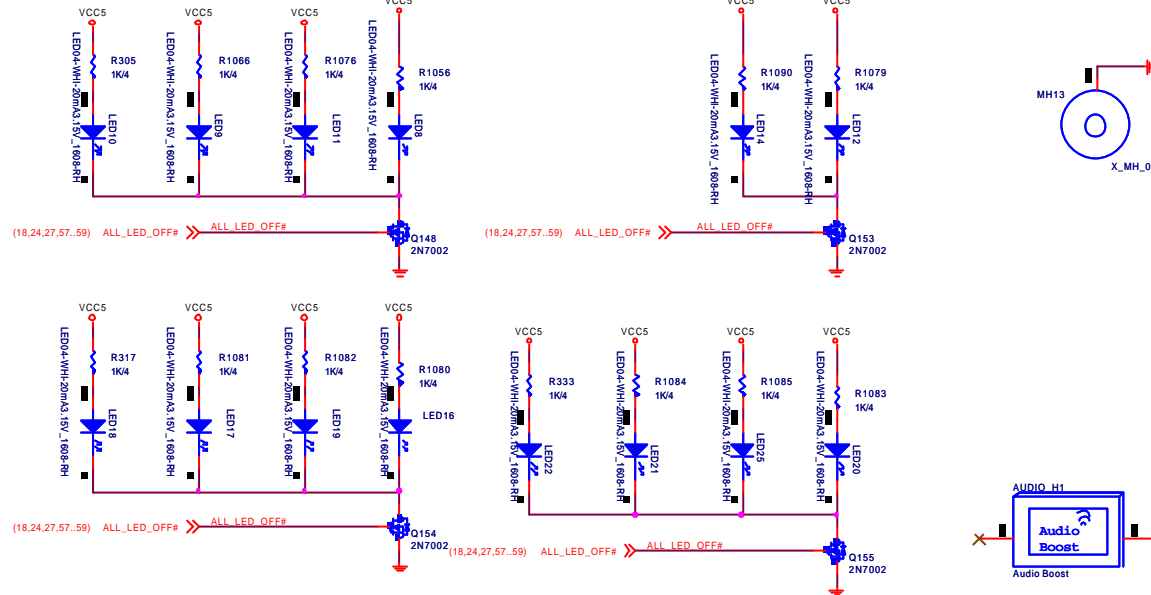


(5,10,11,16,24,28,45) CHIP\_PWDG >> R660 1K1%/4 PCH\_XDP\_RST#

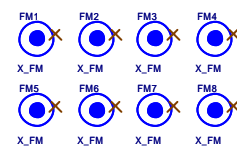
PCH\_XDP\_PWRGRD661 1K1%/4 RSMRST# << RSMRST# (11,24)



# AUDIO MSTAT

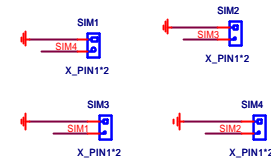


## Optical Fiducial Marks-120

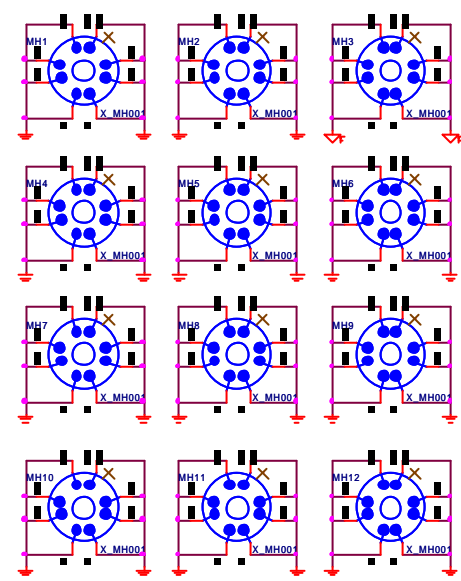


PD0-078110A-E48, 競華, 23, 寶安恩斯邁廠 (MSIS)  
PD0-078110A-E48, 競華, 23, 寶安恩斯邁廠 (MSIS) 8, black

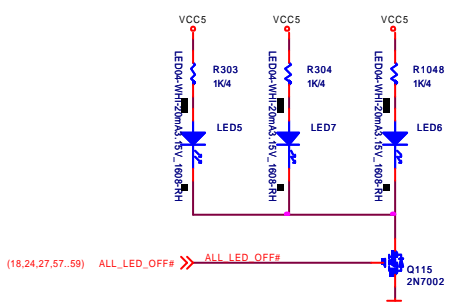
## Simulation



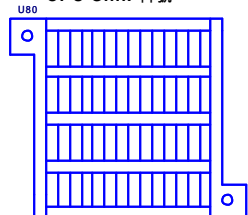
## Mounting Holes



# PCH

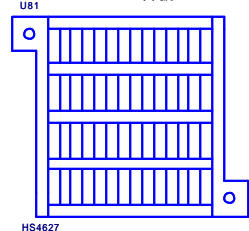


## CPU Sink 料號



## Heat Sink 料號

## PCH Sink 料號



OPT	Configure	BOM	Function
		601-7751-10S	MS-7751 30 Z77 MPower 4*DDR3+3*PCI-Ex16,4*PCI-Ex1,+4*SATAII+2*SATAIII +8*USB2.0+8*USB3.0+HD 8Ch Audio+HDMI+DisplayPort+Gb LAN,Hi-C CAP,EuP,RoHS

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